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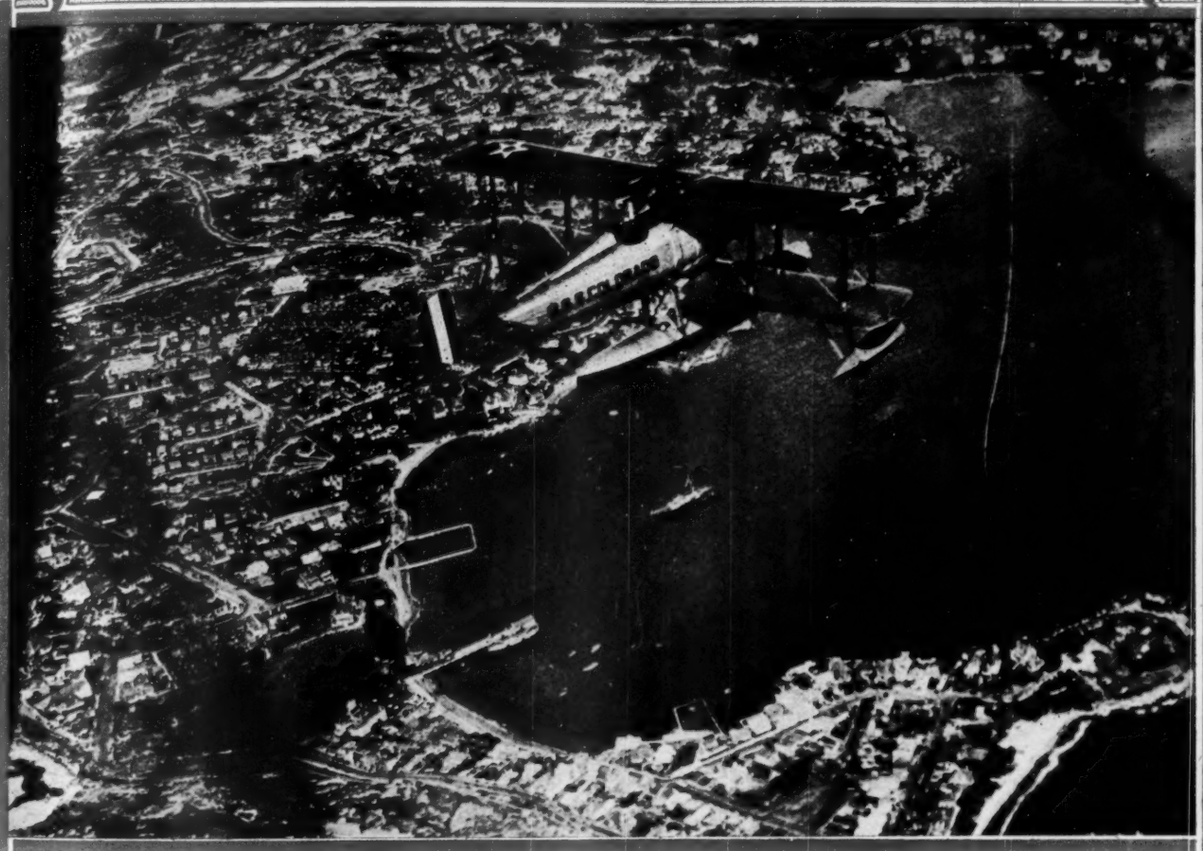

Vought seaplane from the U.S.S. Colorado over Sydney Australia

Photo Underwood & Underwood

VOLUME XIX

NUMBER 12

SPECIAL FEATURES

PN9 REACHES HAWAII

BRITISH SCHNEIDER CUP ENTRY

ADMIRAL MOFFETT DEFENDS NAVY

THE STRENGTH OF THE SHENANDOAH

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SEPTEMBER 21, 1925

AVIATION

VOL. XIX. NO. 12

Published every Monday

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VOL. XIX SEPTEMBER 21, 1925 No. 12

The Hawaiian Rescue

COMMANDER JOHN RODGERS when he returned from being lost for nine days good naturedly twitted those who had believed him one of the dead air heroes and had added his name prematurely to the roll.

"It is a wonderful sensation. There's one advantage of being dead. You learn what the world thinks of you. If what was said is favorable, then it's a pleasure to return to life."

The aeronautical world gave a shout for joy when the lost fliers were reported to be safe. When it was learned that Commander Rodgers had eluded the whole naval searching fleet and sailed his seaplane four hundred miles, two very obvious facts were once and for ever established. One is that ship protection for aircraft is not of great value unless the aircraft finds the vessel and, another is that metal hulled seaplanes can withstand the buffeting of ocean weather. A minor lesson is the necessity of further study of the possibilities of rigging sails on large flying boats.

Too little has been said of Lieutenant Connell who is reported to have been at the wheel constantly for twenty-two hours of the flight with only one hour relief. Commander Rodgers, as it was known he was going to be for some time before the flight, was immediately honored by being appointed Assistant to Admiral Moffett. It is to be hoped that suitable recognition will be given to the others on board as well.

The Dangers of Public Speed Races

MANY of the soundest minds in aviation have long decried the methods and claims of the publicity seekers and have considered that flights made to establish records have led the general public to expect the airplane to do normally what it has only been able to do as a hazardous stunt. Such an impression, it is claimed, reacts unfavorably when those who are sufficiently interested to back airplane projects find out that in practice the airplane is unable to live up to the much advertised records. These arguments will be greatly reinforced by recent events.

During the past five years the Pulitzer speed races have played a major part in bringing aviation to the public attention. It is undoubtedly true that these high speed races have been a great drawing card but, in spite of this, there has been a growing feeling on the part of those who know the facts that the publicity and technical advancement attained may not be worth the cost and risks involved.

Last year no new machines were built for the Dayton Races. The races resulted in the deaths of Pearson and Skeel and were a great blow to aviation. There was a strong feeling among Air Service officers that speed racing with experimental planes should not be continued. It was felt that experimental planes should not be subjected to the ordeal of flying at maximum speed under scheduled conditions; that the people who saw a racer fly were not impressed with the safety of aviation and that scientific results could be better checked under official testing conditions than under the glamor of publicity. The Navy had refused to participate in land races and had announced publicly that in the future it would confine its activities to overwater-racing. However, in spite of the better judgment of the majority of officers of the Air Services, political and other influences induced the Secretaries of War and Navy to order the building of three new racers for this year, and participate in speed racing with experimental machines.

Aviation must be brought before the public but it would seem there might be better methods of emphasizing its importance than holding a stunt exhibition with racing planes. The English, for example, have a great annual pageant in which they exhibit the new types of aircraft developed during the year. Bombing, pursuit work, formation flying and smoke screens are demonstrated to the public. The public is shown what aircraft can do and how they do it. Judging from the crowds, the public is intensely interested. The pageant idea demonstrated the practical side of aircraft to the public and, besides this, a great concentration of aircraft of all types has a real military value. Publicity is necessary but it should be along practical and service lines.

The Strength of the Shenandoah

THE wreck of the airship Shenandoah, forming, as it does, a basis for a complete resumé of present knowledge and past experience in respect to the structural design of the rigid airship, will undoubtedly serve to make clear the limits to which airship design may go. That the designers of the Shenandoah were, from its inception, fully aware of its limitations, is clearly shown in a paper, which was presented to the Royal Aeronautical Society last year. Certain features in this paper, which it is considered represents the most complete treatise on the structural strength of rigid airships ever yet compounded in concise form, are extremely noteworthy, and it is fully anticipated that this paper will eventually play a very important part in solving the questions relating to the structural failure of the Shenandoah.

Certain sections of the paper are of extreme interest at the present time in view of the particular features of the major collapse of the airship. It is, for instance, important to observe the particular attention laid by the writers upon the stresses to be expected at and in the vicinity of frame 90, resultant upon rapid vertical accelerations and the partial deflation of mid-section gas bag, for it will be recalled that it was at this very section that one of the primary fractures occurred. The whole paper is worthy of the closest scrutiny and study. Certain selections, however, which appear to be of particular importance in regard to the recent accident, have been extracted from the main text and reprinted and commented upon in this issue in the hope that the closest attention will be given by the investigating board to the views of those so closely acquainted with the capabilities and limitations of rigid airship design.

Why the Shenandoah Failed

Possible Technical Reasons for Destruction by Elements Given by Her Designers

"The design of a rigid airship is the boldest and most exacting engineering adventure man has ever attempted."

This is the conclusion that was reached by the designers of the Shenandoah in a paper submitted to the Royal Aeronautical Society in June 1924. Commander J. C. Hunsaker, U.S.N., C. P. Burgess and S. Truscott prepared a study which they titled "The Strength of Rigid Airships," which has been published by the Society.

For 121 pages, the most exhaustive study of airship engineering is given and from these can be secured the reasons for the failure of the Shenandoah to meet the strains put to her by the storm over Ohio. As will be seen from extracts of the technical paper printed below the designers of the Shenandoah assert that it is folly for an airship to enter storm areas. The rotating storms "can and must be avoided." The paper gives most interesting figures of the factors of safety under different conditions. In extreme cases this is as low as 1.11. The force of cumulus or storm clouds "it seems entirely impossible to calculate and should be considered a warning of danger that should be avoided." In no way should this knowledge or the statements made be considered a criticism of the navigation of the airship. It merely shows that through the successful accomplishments of the ship, she was thought capable of trips that her designers had warned were dangerous, and scheduled for trips that no aircraft of such a delicately designed construction should be called upon to make. The italics have been used to emphasize certain points and were not used by the authors. Whatever the reports of the board of enquiry may be this exposition of the inherent weaknesses of airships should clear the designers of any lack of frankness as to the limitations of their structure.—EDITOR.

The most important and most significant part of the paper is the chapters on "Aerodynamic Forces due to Weather." It requires no comment.

"It is obvious that any airship has certain limitations upon its operation placed by wind and weather. Airships are somewhat in the position of the modern steamship which is forced to slow down in a heavy seaway to preserve her structural integrity. Consequently, a rigid airship being of great size and delicate construction should be operated with due consideration for the weather. The most effective way to maintain a high factor of safety is to operate the ship at reduced speed when at low altitudes. This has an important effect in relieving the aerodynamic loads to which the ship may be subjected when turning and maneuvering, regardless of weather conditions.

Complex Atmospheric Conditions

"An additional advantage in reserving full speed for fair altitudes is to be found in relatively smoother air at such levels. *The turbulence of air flowing over rough ground, which is felt as gustiness, is too highly complex to lend itself to exact measurement or general definition. The altitude at which the gusts are no longer felt depends upon the nature of the country and of the season of the year, but ordinarily above 2,000 ft. conditions should be calm, although in the winter, at a time of high pressure, gusts have been felt at altitudes above 4,000 ft. We have concluded to omit a strength calculation for the case of a ship running at full speed through a gusty surface wind.*

"In addition to the general turbulence of the wind at ground level, there are to be expected large eddies caused by prominent obstructions, such as a hill or a cliff, and these eddies may be felt at an altitude of from four to five times the height of the obstruction. If the ship is restricted to full speed at a good altitude, the effect of such eddies is not of importance.

"Convection currents due to unequal heating of air near the ground give rise to vertical movement in the air which extends to considerable altitudes. Professor Humphreys, on page 215 of his "Physics of the Air," states that pilot balloon measurements have shown vertical velocities of more than three meters per second either up or down under conditions not necessarily associated with the formation of clouds. This must be considered as an ordinary condition which the ship will encounter without warning when running at full speed.

"The most serious condition of vertical air velocity is to be met with in and around cumulus clouds. C. F. Brooks, in the "Monthly Weather Review" for June 1922, describes observations made by him of the vertical motion of cumulus tops, in which he observed vertical motions of 3, 4 and 7 meters per second. Professor Humphreys, in his "Physics of the Air," page 105, estimates that in order to account for the hailstones that are often formed in cumulus clouds, there must be an uprush of air of the order of 8 to 10 meters per second.

Violence of Cloud Winds

"From a general survey of existing meteorological data, it seems clear that the winds inside a well-developed cumulus cloud are of great violence and present a real menace to an airship. In addition to a possible and probable vertical current of more than 7 meters per second inside the cloud, there may be a down draught around the outside edges of the order of 1 to 2 meters per second due to cooling from evaporation in this region. This would indicate that there are fairly narrow boundaries between air that is affected by the conditions causing the cumulus cloud and relatively undisturbed air, and an airship running into such a cloud will experience a sudden and violent force. *This force it seems entirely impossible to calculate, and cumulus clouds should be considered a warning of danger and should be avoided.*

"It is possible that a ship under certain atmospheric conditions may run into disturbed air, possibly unmarked by clouds, at the boundary between two strata of unequal temperature, and in this condition may encounter a peculiar wind structure. There is evidence from windrow cloud formations of a relatively slow period wave motion at such a "sheet" of discontinuity similar to deep sea rollers. For plausible values of velocity and density, numerical substitution indicates that the wave length should be long compared with the length of the ship. No attempt has been made by the authors to calculate the effect on the ship, but Capt. A. Heinen, an experienced Zeppelin pilot, states that this condition is familiar to him and that he has never observed anything of violence about it. His practice is to proceed at full speed through windrow clouds.

"It seems reasonable to conclude that gusts, turbulence and eddies near the ground need not be considered in the design of the airship except for the condition of handling on the ground and lying to the mooring mast. The problem is quite similar in its uncertainty to the selection of adequate ground tackle for mooring a vessel in an open roadstead. A seaman knows when to cast off and put to sea to ride out the blow.

Tornados Visible Ahead

"The existence of veritable fountains of upward rushing air whose sides at times and places are sharply separated from the surrounding atmosphere, must be taken account of in the design of the airship. *The most violent of such currents, the*

tornado, combines vertical velocity with rotation, but fortunately, can be seen from a great distance and can and must be avoided. The thunderstorm with large fully developed cumulus tops is also conspicuous and avoidable. It would appear to be folly to enter such a cloud and subject the ship to the unknown dangers of wind, rain, hail and lightning. Barring such spectatcular and presumably avoidable hazards as these, there remain, at flying altitudes, convection currents with attendant turbulence which the ship may run into at full speed. There is ample evidence that upward velocities as high as three meters per second will be encountered.

"The calculation for the ship flying through still air with a pitch angle to obtain dynamic lift has been previously described. The same calculation should apply for the case of such vertical air currents, but remembering that with a substantial trim by the stern the ship cannot make full speed, while now we consider a ship at full speed running suddenly into an up current of air. It is calculated that when the ZR1 is proceeding at a speed of 86 ft./sec. and suddenly runs into a gust giving the effect of 6 deg. yaw or pitch, the maximum bending moment will be 318,000 meter-pounds, which is the greatest bending moment found in our calculations.

Importance of Experience

"In the end the design of a ship, to be strong enough to withstand reasonably intelligent handling in reasonably unfavorable weather, must be based upon experience and comparison with many examples of successful and a few examples of unsuccessful practice. Ocean-going vessels are calculated in an arbitrary way with factors of safety (or experience) which do not involve the estimation of the true force of storm waves."

With regard to the ship being overweight it appears that this was due to an overweight in the duralumin sheets as will be seen from the following paragraphs.

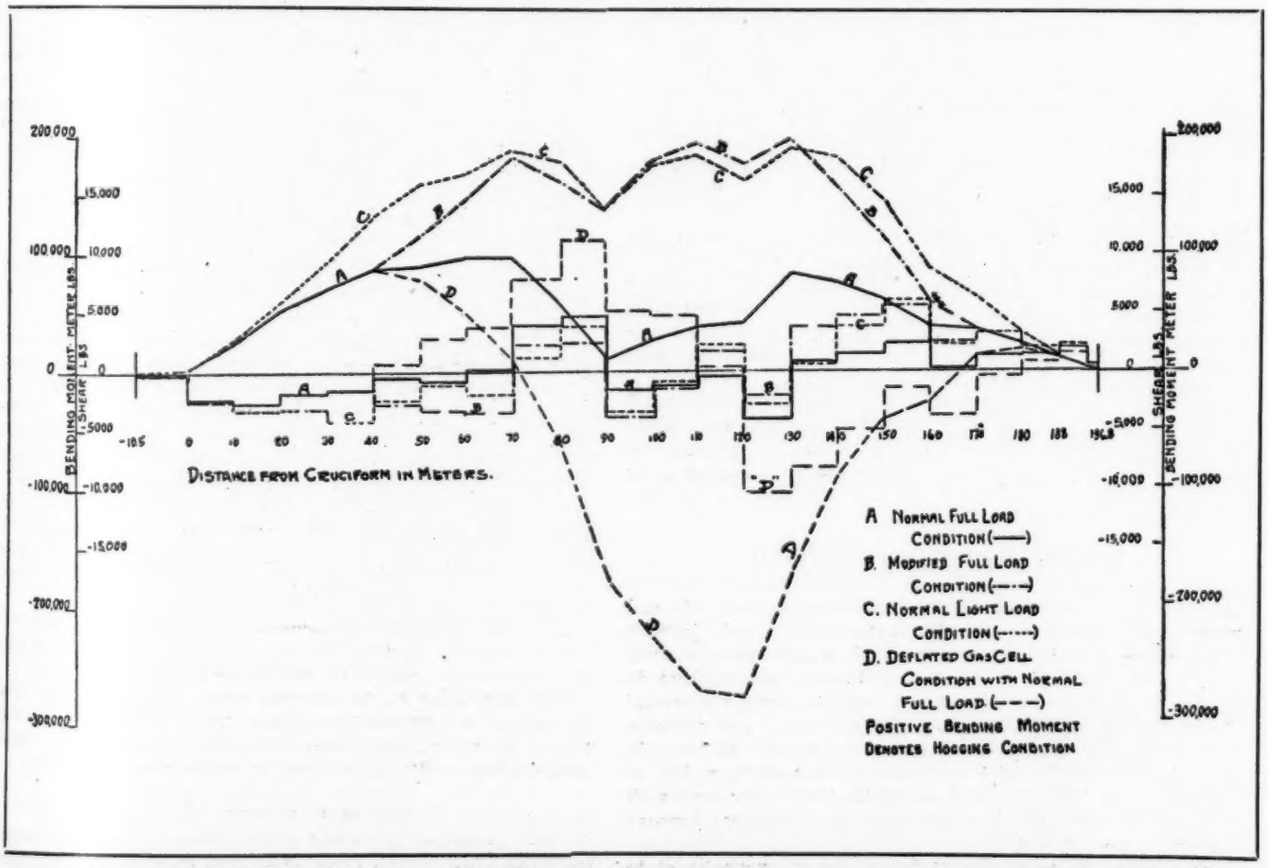
"Once deliveries were well under way it was found that almost all of the sheet was being made on the thicker side of the nominal thickness and usually just under the maximum allowable thickness. This meant a substantial increase in the weight of the ship over estimates."

Designers Knew Weaknesses

When it is recalled that the Shenandoah broke at frames 90 and 130 the curves of static shear and bending moments in the chart and the comment in the chapter on "Static Forces Affecting the Longitudinal Strength" are convincing proof that the designers knew the weakness amidships.

"In an airship floating in static equilibrium in the atmosphere there are inevitable inequalities in the longitudinal distribution of weight and buoyancy, producing what are usually designated "the primary static shearing forces and bending moments." The computations of the distribution of the weight and buoyancy along the hull, and the resulting shearing forces and bending moments according to the well known methods of naval architecture, present no difficulties; and the procedure to be followed in such computations calls for no explanation, except to note that the weight and buoyancy forces are most conveniently assumed to be concentrated at the main transverse frames, instead of distributed continuously along the hull. This assumption is justified because the buoyancy forces are carried to the main frames by the wiring and the longitudinal girders; and the principal loads are also carried to these frames by the wiring and the keel and the car suspension.

"The designer endeavors to dispose the loads in the manner most suitable for the structure, in so far as other considerations may permit; but it should be remembered that in a modern rigid airship the disposable and movable loads, such as the fuel, ballast, passengers and crew, constitute such a large proportion of the total weight of the airship that improper distribution of these loads while in flight may easily bring about dangerously large stresses. It is the duty of the


BENDING MOMENT METER LBS.
SHEAR LBS.
DISTANCE FROM CRUCIFORM IN METERS.
A NORMAL FULL LOAD CONDITION (——)
B. MODIFIED FULL LOAD CONDITION (—·—)
C. NORMAL LIGHT LOAD CONDITION (·····)
D. DEFLATED GAS CELL CONDITION WITH NORMAL FULL LOAD (– – –)
POSITIVE BENDING MOMENT DENOTES HOGGING CONDITION

Curves of Static Shear and Bending Moment for Airship ZR1. It will be noted that the greatest stresses occur in the vicinity of frames 130 and 90 where the Shenandoah actually broke

designer to determine a limiting range for the infinite variety of possible load distributions in all conditions of fullness of gas cells, or altitude of the airship, such that the static shearing forces and bending moments will not become excessive. It is the duty of the commander of the airship to maintain the actual load distribution within the limits set by the designer.

"Curves of the loads, shearing forces and bending moments for the airship ZR1 in some typical conditions are given in Fig. 15. An interesting point to be learned from these curves is that the maximum bending moment in the full load condition is increased from 97,450 meter-pounds to 196,310 meter-pounds by the following small changes in the distribution of the loads:—

2,200	lb.	of	ballast	from	frame No. 100	to frame No.	40.
2,200	"	"	"	"	110	"	170.
1,220	"	"	"	"	70	"	60.
610	"	"	"	"	70	"	80.
1,220	"	"	"	"	130	"	160.

"The change in the bending moment due to this movement of the disposable loads causes an increase of about 2,200 lb./in.^{2} in the maximum tensile and compressive stresses in the longitudinals.

Deflation of Gas Cells

"In the event of a gas cell becoming deflated, it is necessary to maintain static equilibrium of weight and buoyancy by dropping fuel or ballast or other weights. It may also be necessary partially to deflate the adjacent gas cells in order to relieve the pressure on the transverse frames, and this additional loss of gas will require further jettisoning of disposable loads. So far as possible, the loads should be dropped from the region of the loss of lift, but even with this precaution, large static shearing forces and bending moments may be developed. The proper distribution of loads and the magnitudes of the resulting shearing forces and bending moments in various deflated gas cell conditions must be investigated by the designer; but the problem is quite simple and straightforward, although it may be somewhat long and laborious. It was found that in the ZR1, in the fully loaded condition, the complete deflation of the gas cell between frames 110 and 120, and half deflation of the adjacent cells in order to relieve the pressure on these frames, and with disposable loads jettisoned in the most favorable manner possible, the bending moment at frame 120 is changed by 358,360 meter-pounds from 81,120 meter-pounds hogging, to 277,240 meter-pounds, sagging. The corresponding change in stress in the top longitudinal is about 7,900 lb./in.^{2}. It may be noted for comparison that the largest calculated bending moment from aerodynamic forces on the ZR1 will be shown to be 318,000 meter-pounds, so that a deflated gas cell can cause severe stresses and great care must be exercised in operating under such conditions.

"In addition to the vertical static forces of weight and buoyancy, there may be transverse forces, either vertical or horizontal, resulting from differences in the air pressure on the opposite sides of the fins and control surfaces, or from unsymmetrical distribution of the air pressure around the cross-sections of the hull.

Aerodynamic Forces

"In the early rigid airships, constructed in Germany and England, the speed was low and the principal weights were concentrated at or near two or three power cars. Consequently the shearing forces and bending moments, due to the static forces of weight and buoyancy, greatly exceeded those due to the aerodynamic forces on the hull and tail surfaces; and if the hull structure had a fair margin of strength against static forces, the aerodynamic forces might safely be neglected. As airships became larger and faster and with more power cars, the weights were more evenly disposed longitudinally, so the static forces became relatively less serious, while the aerodynamic forces, being proportional to the square of the speed, rose rapidly in magnitude and importance.

"For the purpose of our investigation, five principal conditions of aerodynamic forces will be considered, as follows:—

"*(a)* Sudden application of the rudders or elevators when the airship is proceeding along a straight path.

"*(b)* The airship proceeding along a straight horizontal path at a fixed angle of pitch to compensate for excess of weight over buoyancy, or vice versa.

"*(c)* Steady circling flight.

"*(d)* Sudden changes in the direction of the wind when the airship is in straight flight.

"*(e)* Lying to a mooring mast.

"Other possible aerodynamic conditions may be considered as combinations of these five."

Reports by eyewitnesses and survivors of the Shenandoah accident agreed that just prior to the break the complete airship was given a rapid angular velocity about a vertical axis in a sense similar to that which would be caused by a sudden movement of the rudders in flight, only of far greater magnitude, and it would seem, therefore, that the designers' remarks on the effects of such sudden angular accelerations would be of value.

"Several investigators, working independently in the early stages of the development of the problem of aerodynamic forces, came to the conclusion that the most severe aerodynamic condition occurs when the rudders or elevators are first put over. It was urged that this is the worst condition because a transverse force applied to the hull through the center of pressure on the tail surfaces produces a turning moment opposed by the rotational inertia of the airship; and as the angular motion increases, the swinging of the stern reduces the force produced on the tail surfaces by the rudders or elevators.

Angular Accelerations

The authors have also investigated the rate of angular acceleration which would be produced by the pressure on the rudders if suddenly thrown to 20 deg. when the airship is proceeding at full speed. It is shown by the calculation described in Appendix II. that the maximum bending moment for ZR1 would be 107,000 meter-pounds, and the angular acceleration 26°/sec.^{2}. This rate of angular acceleration is so large that the condition of sudden application of the rudders at 20 deg., when the airship is in straight flight, could never occur in actual operation, because the airship will respond to the movement of the control surfaces before they reach their full throw. It follows that the control surfaces and their operating mechanisms should be designed (and have been for ZR1) to prevent too rapid movement of their surfaces, in order to obviate the large forces and bending moments which might be produced by the surfaces reaching full throw before the stern swings appreciably.

"Subsequent investigations, to be described later in this paper, showed that when the airship reaches the condition of steady turning, the resultant force on the tail surfaces is in the opposite direction to that produced by the initial movement of the rudders; and there is also a transverse aerodynamic force on the hull, largely concentrated in the region of the bow, and these two sets of forces acting toward the center of the turning circle give equilibrium with the centrifugal forces. Owing to the concentration of the inward acting forces near the bow and the stern, opposed by the centrifugal forces distributed along the hull, there is a bending moment of opposite sign to that produced by the initial application of the rudders and possibly of greater magnitude.

Need for Extreme Care

The calculation of the stresses resulting from sudden application of the rudders is evidently quite arbitrary and takes a view of actual conditions that cannot be justified. It is included here only for its value as a powerful means for comparing the hull strengths of different airships, for which purpose it has already been found useful. *The actual stresses in flight produced by rudder action will only be learned from full-scale experiments, but it is evident that such stresses may be high if the helm is roughly handled. There is ample reason to urge that an airship in an unfavorable condition as to static*

or dynamic loading be handled with care and preferably at reduced speed."

Since the airship, prior to the final and complete failure in mid-air, was subjected to very sudden and violent changes in altitude and in view of the importance laid by the designers upon even small changes unless adequate measurements are provided, it is noteworthy that they were fully aware of the limitations of the Shenandoah in this respect, as exemplified in the following extracts from their paper

"From these examples may be seen the importance of preventing appreciable differences between the internal and external air pressure; and it is also evident that excess of external pressure is especially to be avoided. The load upon the longitudinals is always inward, unless the cover bulges out beyond the circumscribing circle through the apeces of the longitudinals, and this could never occur unless the cover were extraordinarily slack.

"If the altitude of a rigid airship should change by even such a small amount as the ship's own diameter without passage of air into or out of the hull, the difference between the internal and external air pressures would exceed the difference between the gas pressures at the top and bottom of the hull. The necessity of adequate openings for the flow of air is therefore apparent."

It is a very noteworthy fact that, during a consideration of the stresses and bending moments caused when an airship runs at full speed into a vertical gust under conditions of partial deflation—presumably, therefore, condition similar to those pertaining in the case under consideration—the designers point out the seriousness of the demands upon an already extremely low factor of safety. Special mention of frame No. 90, being one of the two points of major fracture in the recent accident, is very significant. Furthermore, an insight into the values of the factors of safety for the Shenandoah, under specific condition of flight, such as when hogging and sagging, are peculiarly opportune at this time. It is, however, interesting to note that the designers were, apparently satisfied with numerical values of the factors of safety under the circumstances. Their remarks on these points follow

Factors of Safety

"Up to this point the various loads upon the structure have been considered separately. The choice of loading conditions to be combined in estimating the factors of safety is a matter of judgment, and certain comparisons are to be ruled out as representing extreme conditions in which no commander should ever involve his ship. For example, analyses of the bending moments in the deflated gasbag condition and when the airship runs at full speed into a vertical gust show that these conditions may produce at frame 90 sagging bending moments of 277,000 m. lb. and 318,000 m. lb., respectively, and the total bending moment is 595,000 m. lb., with a compressive load of 13,400 lb./in.^{2} in the top longitudinal. In addition there may be a compressive stress of 11,000 lb./in.^{2} in the apex channel from gas pressure and secondary bending of the longitudinals, making the total compressive stress 24,400 lb./in.^{2} in the apex channel at the joint. This portion of the girder is double latticed, and the failing stress is shown by the Bureau of Standards' test to be about 27,000 lb./in.^{2}, so that in this extreme condition the factor of safety is only 1.11.

Theoretical Factors

"With a deflated gas cell an airship should never be driven at full speed even in still air, so that this condition may be considered as too severe for a fair estimate of the real factor of safety.

"Assuming that the crippling stresses in the longitudinals are 27,000 lb./in.^{2} the theoretical factors of safety in these sagging and hogging conditions are 1.68 and 1.82 respectively.

"As was shown in Section VIII., the factor of safety in the transverse frame in the deflated gasbag condition, without any concentration of loads in the keel near the deflated bag, is 1.21. In practice, if it is necessary to carry concentrated loads at a frame sustaining the end pressure resulting from the complete deflation of a gas cell, the neighboring cell would also be partially deflated, so that this may be taken as the minimum factor of safety transversely.

"These factors of safety may appear low in comparison with accepted practice in other branches of engineering; but it will be shown that the ZR1 compares favorably in strength with successful German and British airships, and it is always by the criterion of successful practice that the adequacy of the factors of safety in any branch of engineering must be judged."

The special strength features of the bow and stern of the Shenandoah are interesting.

"It may be noted that in the ZR1 special care has been taken to maintain the strength toward the bow and stern; and in many cases the full sectional area of the longitudinals have been maintained to nearly the extreme bow and stern, although the corresponding members of the German airships have been slightly reduced in area."

Conclusions

In conclusion the designers lay stress upon the fact that details of the structural strength of a rigid airship are wrapped up in experience, and in particular regard to the calculation of external forces due to the elements, the close analogy between the methods of the airship designers and the naval architect is interesting to note, just as also is the vagueness which, it appears, must always surround a thorough knowledge of these factors. The plea for a thorough dissemination of information throughout the world in respect to rigid airship design is very rightfully put forward. Extracts from the concluding paragraphs of the treatise under discussion bring out these points

"The final judgment of the structural strength of a rigid airship rests ultimately upon experience which we cannot yet pretend to have acquired. However, in order to apply experience usefully there must be a theory and a method in order that the isolated facts of experience may arrange themselves to reveal a doctrine for the designer. Academically, if we know, first, the external forces to which the ship in service is subjected, and secondly, the stresses induced in the structural members of the ship by those external forces, we might assign with confidence the factors of safety which are usual in engineering structures. However, the matter will never be so straightforward as this.

Similarities in Naval Architecture

"Since the naval architect with his centuries of accumulated experience is still unable to calculate the precise effect on a vessel of a gale at sea, it seems certain that the force of wind and weather on an airship will remain equally unknowable. Consequently, we must follow the naval architect's method, which is substantially as follows:—

"*(a)* Assume an arbitrary method for the estimation of external forces which will be applied to all ships, making allowance for speed, size, shape, etc.

"*(b)* Employ standardized calculations, as precise as practicable, to obtain the stresses in the structure due to the external forces.

"*(c)* Compare the results of standardized calculations to successful and unsuccessful experience to obtain factors of experience, or factors of safety. *Such a factor of safety is in no sense a true margin of security, but does furnish a powerful method of comparison between some actual airship and a proposed design. It permits experience to be accumulated in useful form.*

"The authors cannot too strongly urge the advantages to the art of the free dissemination of scientific and technical information in order that knowledge acquired item by item may serve to advance civilization, as such knowledge becomes organized. The development of airships has been attended by the disasters inevitable in pioneer work. The pioneers who lost their lives in R38 made the crucial test of the state of our knowledge at that time. We, who follow them, must proceed in all humility and with full appreciation of the lessons which their splendid sacrifice has made available."

PN9 No. 1 Found Off Hawaiian Islands

Commander Rodgers and Crew Sail Flying Boat to Safety

"Plane PN9, No. 1 located by R-4, fifteen miles northwest of Nawiliwili. Personnel safe. Am towing plane to Nawiliwili." This message, transmitted by Lieut. D. R. Osborn, Jr., commander of the Submarine R-4, of Submarine Division 9, heralded to the world, on the evening of Sept. 10, the joyful news of the safety of Comdr. John Rodgers and his crew of four, aboard the naval flying boat PN9, No. 1, which was forced down in the Pacific Ocean, nine days previously, as a result of fuel shortage, when on the attempted flight from San Francisco to Honolulu, of the Hawaiian Islands. The plane was sighted shortly after 4:00 p. m. on the afternoon of Sept. 10 when the submarine was starting out to meet destroyers coming in from the fleet. Her position then was approximately fifteen miles off the Island of Kauai and sixty-four miles northwest of Oahu, the island upon which is Honolulu. She was immediately taken in tow by the submarine and food was given the exhausted fliers, who, however, refused to leave their seaplane while she was being towed in.

The seaplane landed at 11 p. m., three hours after it was towed into the harbor by the submarine. The aircraft dropped anchor and small boats went to her.

The Rescued Crew of the PN9, No. 1, Left to Right—W. H. Bowlin, Aviation Mechanics Mate, Lieut. B. J. Connell, Navigator, Commander John Rodgers, Flight Unit Commander, S. R. Pope, Aviation Pilot, O. C. Stanz, Radio Operator.

The anchorage line of the aircraft then broke and it drifted into the breakers near a coral reef. Attempts were made to take the crew off, but Commander Rodgers and his crew still refused to leave until the plane was towed to a safe anchorage.

The men, who seemed little the worse for their harassing experiences, with the exception that they were all very exhausted, were immediately attended to and permitted to rest and on the following day the destroyer McDonough left Nawiliwili carrying the men to Pearl Harbor, Island of Oahu, where their convalescence continued.

Commander Rodgers briefly outlined the record of the flight and its conclusion in the following paragraphs:—

"The PN9 No. 1 and No. 3 left San Francisco approximately at the same time on Aug. 31, No. 3 leading by about twenty minutes. The PN9 No. 3 was not sighted by No. 1 after departure. Plane PN9 No. 1 proceeded as per instructions, sailing on a straight course to Kahului.

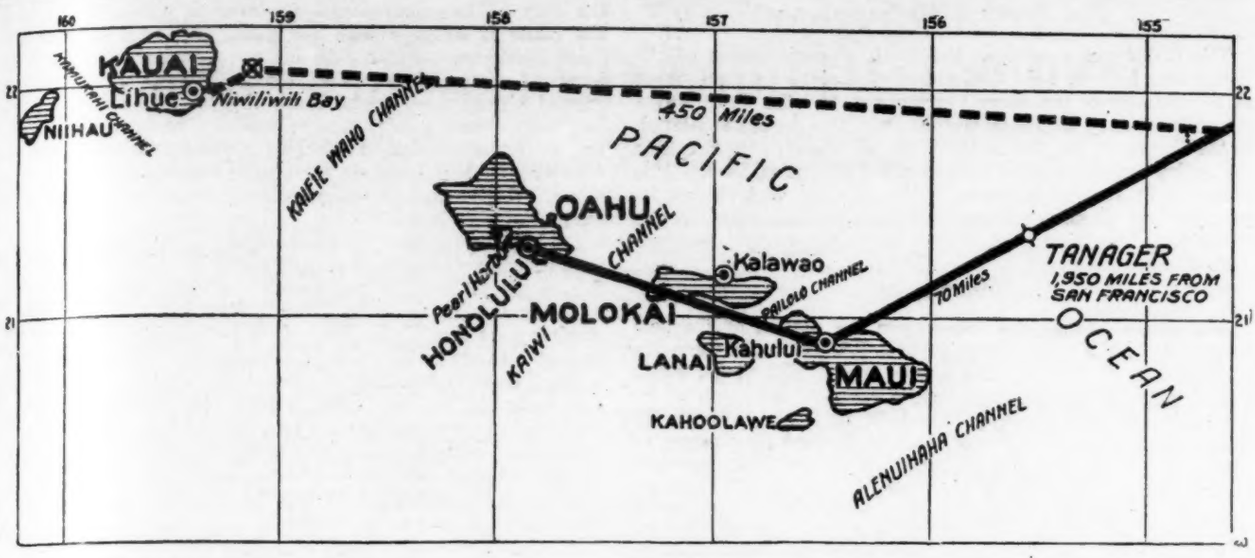
"The wind out of San Francisco was very light from the northwest, gradually hauling to the north. The navigation was done entirely by dead reckoning, no attention being paid to radio bearings. We flew between 200 and 300 ft. below the clouds during the night, the sky being thickly overcast and all destroyers were picked up as expected at a distance easily visible from the PN9, while at the same time the plane was easily visible from the destroyers.

"The engines worked perfectly and there were no signs of leaks or any other trouble. The wind changed to northeast, as expected, about 600 mi. from San Francisco, but was much lighter than had been hoped for. In the morning it became evident that the gasoline supply was running short and it would be doubtful if we could reach Kahului, due to the fact that expected favorable winds were not encountered. About noon we decided that our gasoline supply would carry us about midway between the Aroostook and the Tanager, respectively, the next to the last and the last station ship. I therefore decided to land at the Aroostook, which is a fully equipped airplane tender.

"We still had plenty of gasoline to land, refuel and take off again for Honolulu. This was in accordance with the prearranged plans to meet the situation with which we were faced. On approaching the Aroostook we received radio bearings from her indicating that we were south of her and on reaching a point where I thought she would be visible and not being able to see her, we changed our course to approach on these bearings. It became evident that she would not be found on this course. I started to write a message which would give her some clew to our whereabouts, but just then the gasoline gave out. Both engines were cut out simultaneously and we started to glide from about 800 ft.

"Lieutenant Connell, who had the controls, made a beautiful landing in the heavy swells, both engines being dead, having no power. Due to total expenditure of gasoline we could not use radio, and were, therefore, out of communication at twilight. I determined our position to be fifty miles north of the Aroostook's station. We rigged a radio antenna on the plane and received without much difficulty everything that was in the air. We sailed before the wind, endeavoring to work the plane in toward the Hawaiian Islands, hoping to make Oahu. We made fifty miles a day; that is, an average of 2 m.p.h., although the plane appeared to be making much greater speed.

"We cut the fabric from the lower wing and rigged a foresail. Weather conditions were moderate, although during the afternoon the seas were high. The plane at all times behaved very well. After the first day we felt sure that unless the weather changed very much for the worse we could make Oahu or, failing that we would certainly be able to make Kauai.



Courtesy New York Times

Map showing the section over which the PN-9, No. 1 drifted during the nine days of silence.

"On the 7th, Lieutenant Connell devised lee boards which enabled us to "crab off" the wind about 15 deg. and were of great assistance to us in getting across the Kauai Channel. Without them we could not have made Kauai.

"We passed Oahu about forty miles distance, the island being clearly visible, the afternoon of the 8th, and headed and close-hauled for Kauai. We had reached a point about fifteen miles off Nawiliwili and were trying to signal that port when we were sighted by the patroling submarine, ten miles off Nawiliwili, were taken in tow and towed into the harbor."

It was off the coast of Kauai that the mine sweeper Whippoorwill reported seeing flares a day or two after the search for the missing plane had started. A white flare and two red flares or rockets were believed to have been seen. Immediately after a check of calculations, the searching operations were transferred to this region, which was considerably outside of the zone previously searched.

Commander Rodgers continues: "All during the trip we realized that an extemporized radio sending set would solve our difficulties in a few hours by giving our position to the searching ships. We tried rigging one up, but were unable to make one which worked a sufficient distance.

"The only miscarriage of the plan was due to our failure to find the Aroostook, the ship we had selected to refuel from, having passed along above all other station ships en route."

On landing, the men at once cut loose the starter gear of the motors, dropping them overboard to lighten the hull, which was tossing about on a rough sea. The motors were undamaged.

Lack of Water Acute

Lack of water was said by the men to have been their greatest hardship, although they also suffered from a failing food suppy. At first they sought to overcome their need for water by distilling sea water in a small still which Commander Rodgers had carried at the request of his mother. Wood was used as fuel for the fire, but when this gave out their suffering again became acute.

Resorting to the water in the radiators, the men found that it had become unfit for drinking because of chemicals. A heavy rain last Thursday probably saved their lives, for they were able to catch enough water on canvas to tide them over. Even this, however, was not refreshing because of the aluminum paint.

Next to food and water, the members of the crew said they missed tobacco most. Three cigars, the last of their supply, were smoked "cooperatively."

The members of the crew all joined in praising Commander Rodgers for his part in bringing them to safety. They said the commander passed almost all of his time in the front cockpit, figuring positions. He stood practically twenty-four-hour watches.

The food question was one of the troubles of the trip. When they left San Francisco the birdmen had what was looked upon as plenty of food for the journey. Believing they would be picked up almost at once, they consumed practically all of their provisions in their first two days afloat. From then on they subsisted almost entirely on hardtack and water. As the days went on, they even picked up the crumbs, ate them and searched for more.

The PN9 was sailed with an extemporized fabric jury rig, over a distance of approximately 400 mi., safely, and on one occasion, when they almost made the coast of Oahu but were carried on by the wind, Commander Rodgers cheered his companions with his confidence in their ability to reach Nawiliwili Harbor and even to sail to a safe mooring.

During this period messages radiocast by the searching plane and surface ships were all picked up by the downed seaplane, but it could not put messages on the air in response. This was due to the fact that its drooping antennae was under water.

The fliers even picked up radio messages at sea, before the rescue, from the U.S.S. Langley saying that at a conference of twenty-one pilots it was unanimously agred that the PN9 No. 1 and its crew were lost.

Ship in Sight

"We sighted a merchant vessel five miles off. Signals were sent up repeatedly and every effort was made to attract attention, but the steamer passed on," said a member of the crew.

"Our plane was able to pick up messages from the steamer, which refused to divulge its name, but drifted to the northwest. After that no searching ships or planes were sighted, until last Tuesday, when we saw a plane off the coast of Oahu."

PN9, in Good Condition

The seaplane apparently is in excellent condition, except that the lower wing on one side needs repairs, having been purposely ripped by Commander Rodgers to secure cloth for a sail. The battering waves apparently had not damaged the fuselage in the least. There was no sign of leakage.

It is estimated that the seaplane had drifted approximately 300 mi. after alighting. They placed the drift of the current, in which the ship was floating, at about one knot an hour, to which the improvised sail added one-third.

The names of these five men who so courageously not only covered by air the major part of their intended flight across the Pacific but successfully navigated their flying boat for nine days over the stormy seas in their efforts to complete the journey undertaken, are now so well known that it would seem unnecessary to repeat them here. They are, however, Comdr. John Rodgers, Lieut. B. J. Connell, W. H. Bowlin, S. R. Pope and O. G. Stantz.

The Navy PN9 Seaplane

The PN9 type seaplane is the result of development of the flying boat type of twin engine tractor biplane by the Bureau of Aeronautics of the Navy Department, and the U. S. Naval Aircraft Factory at Philadelphia, Pa. Due to the similarity in the shapes of the hull to the U. S. Navy F5L type seaplane the entire exterior appearance of the PN9 resembles it. The plane is in reality, however, quite different and cannot be compared as to size and shape with any other plane so far developed.

Dimensions

The dimensions of the plane from the bottom of the keel to the top of the upper wing is 16 ft. 6.87 in., while the overall length is 49 ft. 2 in. from bow to stern. The wings, which are of the high lift type and have a chord of 9 ft., are 72 ft. 10 in. in span on the upper, and 67 ft. 2 in. span on the lower surface, with a gap of 9 ft. 4 in. and no stagger or sweep back. The angle of incidence is set at 2 deg. and though the upper wing is flat there is a dihedral angle of 3 deg. in the lower surface. The total wing area is 1217 sq. ft. The lower wing roots are constructed into the top of the hull behind the pilot's cockpit, and stability on the water is provided for by the fitting of wing tip floats.

Between the wings and on each side of the hull is a power nacelle streamlined and supported by metal struts. Each power nacelle contains a 500 hp. Packard engine developing a little in excess of that when turning up its maximum number of 2300 r.p.m. The engines, however, are never, except in taking off, run over 2000 r.p.m. Each power plant weighs 700 lb., thus giving excellent conditions of low weight per horsepower—about 1.4 lb.

Due to the fact that engines are more efficient at high speeds and propellers at low speeds, a reduction gear with two to one ratio is incorporated in each engine as an integral part of it. The propellers, which have two blades, are made of wood and have a diameter of 13 ft. and a pitch of 9 ft. The radiators in the nose of each engine nacelle have a water capacity of 17 gal.

The Hull Accommodation

In the rear of each engine and streamlined into the rear section of each nacelle is a 50 gal. oil lubrication tank while underneath the engine and also within each nacelle is an oil regulator, used to heat the oil when starting and cool it as it leaves the engine. Within the center section of the upper wing is a 97 gal. gasoline tank from which the engines are supplied. Gasoline is pumped from tanks in the hull to the tank in the wing by two wind driven gasoline pumps mounted just aft of the center section.

The metal hull, which is 14 ft. 2 in. in length and 10 ft. 2½ in. in maximum beam and tapers off toward the stern, is constructed along lines worked out after extensive experimental work by the Bureau of Aeronautics. The most noticeable feature is that, as a result of this development work, the hull of the PN9 is approximately 500 lb. lighter than any similar now in use.

Instruments

Beginning at the bow and continuing aft, the hull detail is as follows: first, the navigator's compartment, which is 3 ft. by 4 ft. and 3 ft. deep, having at the top a manhole entrance 3 ft. in diameter. On one side a chart board is mounted upon which is plotted the course of the ship through the air. While in the front of the cockpit is a shelf for sextants and other instruments. Also, in front of the cockpit are an altimeter, an air speed meter and an earth indicator compass. This compass is influenced by the magnetic lines of the earth and, as the ship is held on one course or another, then a greater or lesser number of magnetic lines are cut by a rotating armature actuated by a small wind driven propeller, thus varying the current in the circuit. Using a sensitive galvanometer as an indicator, the navigator can easily see if he is on or off the course. Two drift indicators are mounted in the bow, one in front of the cockpit and one in the rear. These instruments are used to obtain the amount the plane is drifting with the wind, just as a ship at sea drifts with the current. At intervals during flight, a sight is taken along the vanes of the instrument at a passing ground object or a smoke bomb thrown overboard, and for any drift found a correction is made. The navigator's cockpit is further equipped with an aperiodic compass, an extremely sensitive compass used as a check on other instruments. A standard chronometer and siduial watches are also mounted in the bow.

Behind the navigator's compartment is the pilot's cockpit with accommodation for two pilots side by side and fitted with dual controls and all the necessary instruments. The radio operator is situated aft of the pilot's cockpit. The radio receiving set is a U. S. Navy six tube standard type SE1950 having a range from 200 to 2300 meters. The sending set is a Navy two 50 watt tube set model SE1385 and has a working range of 400 mi. using a small wind driven generator secured to one of the after port engine struts. The antenna consists of 300 ft. of copper wire trailed from the plane. At the extreme rear of the compartment is a directional antenna or radio compass by which the operator can secure radio bearings of ships or shore stations.

Fuel Tanks

The PN9 is equipped throughout with electric lighting and for emergency landing at night, electric wing tip flares are fitted outboard of the wing tip floats. Between the radio operator's quarters and the pilot's cockpit and filling the entire main portion of the hull, are situated eleven gasoline tanks with a total capacity of 1181 gal., which, with the 97 gal. tank in the upper wing center section, makes a total capacity of 1278 gal. A fourteen inch passageway between the tanks extends from the pilot's cockpit to the radio compartment.

The ship weighs 19,200 lb., of which 9800 lb. is useful load, including pilot, gasoline and oil.

With an average cruising speed of 70 knots the plane can remain in the air 28 hr. 30 min. It has a fast speed of 116 m.p.h. and a stalling speed of 64 m.p.h.

French Aviator Sets New Speed Records

It is reported that Fernand Lasne, a French airman, lowered on Sept. 12 the world's speed record over 1,500 and 2,000 km. distances, hitherto held by an American pilot, Lieut. Harold R. Harris.

Lasne, flying a Nieuport Dellage machine, with a 500 hp. Hispano-Suiza engine, covered the 1,500 km. over the Etampes-Marmogne circuit in six hours fifty-one minutes seventeen seconds, an average speed of 218 km. 827 m. an hour (135.461 m.p.h.). He made the 2,000 km. distance in nine hours eight minutes thirty-two seconds.

Lasne now holds four world records for speed.

Aeronautical Draftsmen Wanted

The Naval Aircraft Factory, U. S. Navy Yard, Philadelphia, Pa., has several vacancies for aeronautical design and detail draftsmen.

The rate of pay for design draftsmen ranges from $7.60 to $9.68 per diem with appointment at the minimum rate. The duties of appointees will consist of laying out and developing work completely from preliminary instructions. Appointees must be capable of performing the highest grade of drafting work required in connection with aeronautical design and of making the engineering calculations pertaining thereto.

The rate of pay for detail draftsmen ranges from $5.84 to $7.20 per day, with appointment at the minimum rate. The duties of appointees will consist of the design of details of the structure and fittings of aircraft. Appointees must be familiar with the ordinary calculations required in structural design.

Applicants should address the Chief Engineer, Naval Aircraft Factory, U. S. Navy Yard, Philadelphia, Pa., giving full details as to their education, experience and qualifications.

Admiral Moffett Replies to Accusations

The Navy Air Chief Denies All Charges against Naval Administration

In order that a complete viewpoint on the controversies existing between the two sides of the air defence and policy question, may be completely set forth the statement made by Admiral Moffett, being the only definite reply to the allegations of Colonel Mitchell, is reprinted herewith.—EDITOR.

"The time of national bereavement, when the heart of an entire nation is heavy with grief over the loss of fourteen members of the crew of the Shenandoah, and when hope of the rescue of the crew of the PN-9 had about gone, was seized upon by the proponents of a separate air force as a fitting time for the advancement of their claims by an attack upon the agencies of the government charged with the development of aviation.

"Before the Shenandoah dead had been buried charges were broadcast in the public press, which in their falseness and vindictiveness are almost without precedent in the history of this country. These charges, couched often in the form of questions to protect the originators, are so palpably false as to make one wonder how they could have been seriously considered.

"Launched in a moment of great stress and intense emotion, they have done incalculable harm to the nation. It is only now that their absurdity is beginning to be understood.

"These false charges are made in the guise of bringing about a reform in our system of national defense and of advancing aviation. As a matter of fact, they have done more to retard aviation and hamper national defense than could have been accomplished by any other means.

Unscrupulous Self-Seekers

"Destructive criticism has shaken confidence of the country in its government. Examples of disloyal conduct have sown the seeds of discord in aviation establishments. False charges have branded loyal servants of the people with the stigma that denial can hardly efface. The revolutionary methods of the Communists have been invoked to overcome the opposition of loyal men who have sought to thwart the ambition of unscrupulous self-seekers.

"The ambitions of these selfish men are as unbounded as their methods are unscrupulous. Their tactics are those of the demagogue. They like to pose as eagles soaring aloft with keen eye for the country's defense. They have really played the part of vultures sweeping on their prey once it is down.

"The most disturbing factor in the situation is the example of military officers in the employ of the government making a political appeal over the heads of Congress to the people. This might be the opening wedge for military dictatorship in the United States. If personal political appeals of military demagogues are to go unheeded it bodes ill for the future of this republic.

Where Responsibility Lies

"Equally astonishing is the fact that charges have been preferred by persons who have responsibility for the short-comings which they allege to exist. It has been charged that Lieutenant Pearson and Captain Skeel were killed in dilapidated racing planes at the last racing meet. If these planes were dilapidated, it was the duty of a high-ranking army aviator, who was present at the meet, to exercise his authority and prohibit their use. This was not done. Responsibility lies with this man and he cannot evade it by trying to shift the responsibility to the system.

"It has been charged that an arrangement existed between the army and the navy that the navy should take the races one year and the army should take them the next year, thereby creating propaganda and not service. This statement is utterly and unqualifiedly false. It is ridiculous on its face, but is, at the same time, characteristic of the other charges.

"The army and navy have been charged with making propaganda and seeking publicity by the very persons who are past masters of this. It is the business of the army and the navy to keep the public informed of their activities. The public is entitled to know what its armed forces are doing, but the army and navy have not stooped to low sentimentalism or falsehood.

Denies Propaganda Charges

"It has been charged that the Shenandoah was going West on a propaganda mission to offset the adverse publicity caused by the failures in the Pacific and the Arctic. This flight was planned for last summer in response to the numerous requests of the people of the United States for an opportunity to see the ship. The trip was postponed at the request of Captain Lansdowne and the final plans were in accord with his wishes.

"The Shenandoah had demonstrated that she was perfectly capable of handling herself in ordinary thunderstorms. She was the victim of a cyclone which no man or material could resist. The devastation wrought by cyclones on land is evidence of this. The change in her valves had nothing to do with the accident. Captain Lansdowne is dead and cannot answer these accusations, but those of us who are left will do so with all the energy at our command.

"It has been charged that the Hawaiian flight was arranged to get publicity. This charge, like the others, is absolutely false. This flight was planned to test the ability of the latest design of flying boat to operate at great distances over the sea without support of the fleet. The strategic importance of linking San Francisco by air with the key of the Pacific is apparent to any one.

"Surface vessels were stationed as a safety precaution in case of emergency, but the planes were to do their own navigating, using the surface vessels as a safety check. Had the flight personnel not been confident, as a result of previous actual tests, that they could reasonably expect to complete the flight, it would have been postponed exactly as the project was postponed last year when airplanes built for the purpose were found to lack the range. Commander Rodgers, in a statement, has answered these charges in no uncertain terms.

"The question has been asked why the destroyers did not steam at full speed in the direction the planes were going. The answer is, they did. It has been asked why five men were used instead of two. The answer is that Commander Rodgers knew they were necessary to safety on a long flight over the sea. It has been asked why arrangements were not made to refuel planes in the air. The answer is, this was not a 'stunt' flight.

"It was not expected that additional gas would be required. But as a safety precaution station ships had supplies of gas and oil and the crews had been trained in gassing at sea from surface vessels. The PN9 has amply proved her air worthiness and seaworthiness. She represents a tremendous advance in aviation and her performance has justified her builders.

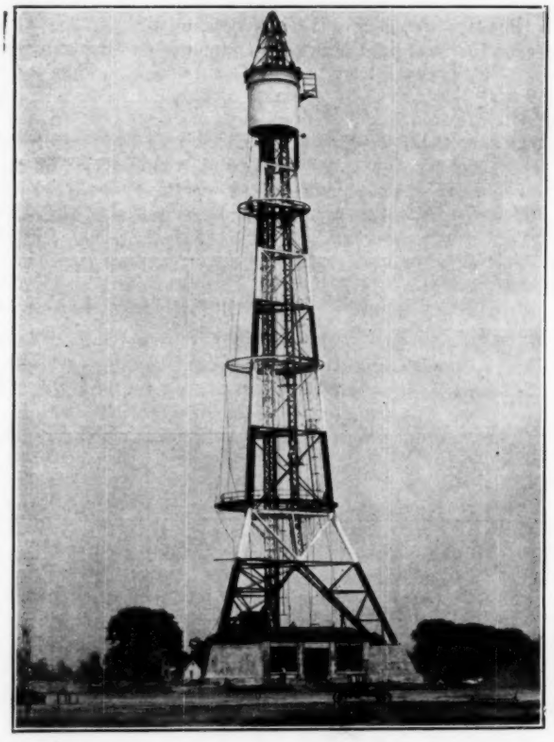
"False accusers of the army and navy blame these accidents on the system and advocate a separate air force as a cure-all. The separate air force in Great Britain did not save the R38. The French system did not save the Dixmude, nor the five French fliers who were lost at sea a few days ago.

A Plea for Loyalty

"Any system loyally administered will succeed. The best system disrupted by disloyalty will fail. The most cheering part of the outcome of the flight is the striking example of loyalty and soundness of judgment on the part of Commander John Rodgers.

"It has been charged that the accidents to the Shenandoah and the PN9 were the direct result of incompetency, criminal negligence and almost treasonable administration of the national defense by the Navy and War departments. Such a charge is absurd in its very extravagance.

"The most charitable way to regard these charges is that their author is of unsound mind and is suffering from delusions of grandeur."



The Ford Mooring Tower at the Ford Airport, Dearborn, Mich.

Secretary Davis Flies to Maine

Piloted by Capt. Thomas Boland, of the Army Air Service, the Acting Secretary of War, Dwight F. Davis, made a long and successful trip by airplane Aug. 26 from Boston, along the coast to Isleborough, Me., a distance of approximately 200 mi. The trip was made in slightly under 2 hr., showing a cruising speed of over 100 m.p.h., and is of particular interest as the trip was made in one of the Army's new Loening Amphibian planes, which are equally at home either as land planes, or as sea planes and have been found very useful in the operations of the Army Air Service along the Atlantic Coast.

President Coolidge Appoints Air Board

Investigation of Aircraft Situation to Be Made by Independent Board

President Coolidge announced on Sept. 12 that he had appointed a Committee including Major General James G. Harbord of New York, President of the Radio Corporation of America, to investigate the aircraft situation with a view to ascertaining the best means of developing and applying aircraft in the national defense.

The President's action was based, according to the announcement, on a joint letter of today's date presented to him this afternoon by Curtis D. Wilbur, Secretary of the Navy, and Dwight F. Davis, Acting Secretary of War, who recommended the inquiry. The course taken is a direct result of the Shenandoah tragedy and the charges made in the press by Colonel William Mitchell, of the army air service, of incompetency and negligence in both the army and navy air services.

The President's Letter

The announcement was contained in a letter of President Coolidge to Secretary Wilbur and Acting Secretary Davis, made public at the White House.

His letter reads:

Your joint letter stating that "for the purpose of making a study of the best means of developing and applying aircraft in national defense and to supplement the studies already made by the War and Navy Departments on that subject, we respectfully suggest that you as Commander-in-Chief of both Army and Navy appoint a board to further study and advise on this subject," has just been received.

Your suggestion is one which already had my approval so far that last Spring I had conferred with parties as to the desirability of taking such action, so that a report might be laid before me for my information and also for the use of the incoming Congress.

I am therefore asking the following named gentlemen to meet me at the White House on Thursday next at 11 o'clock in the forenoon. I shall suggest to them that they organize by selecting their own chairman and proceed immediately to a consideration of the problem involved, so that they can report by the latter part of November:

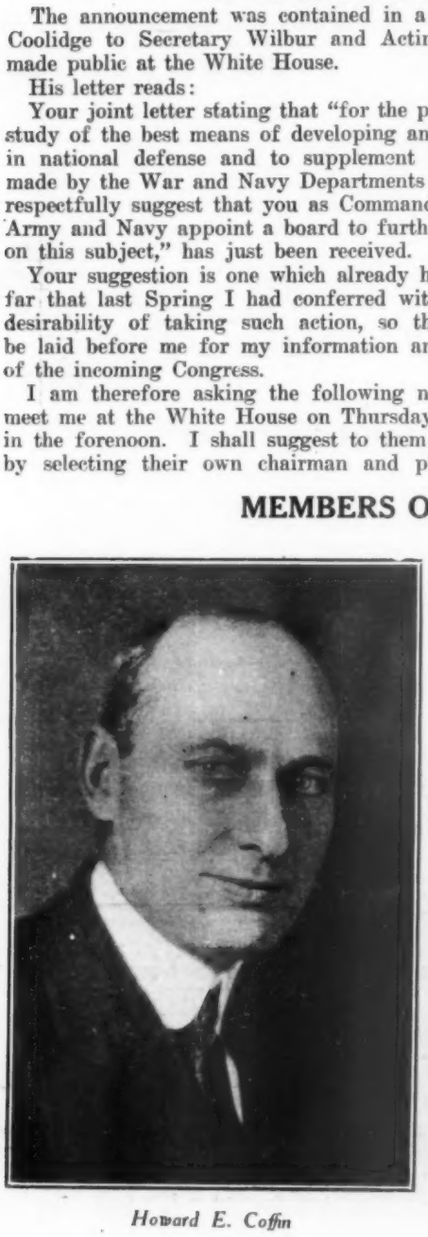
Maj. Gen. James G. Harbord, retired, of New York City; Rear Admiral Frank F. Fletcher, retired, of Washington, D. C.; Dwight W. Morrow of Englewood, N. J., lawyer and banker; Howard E. Coffin of Detroit, consulting engineer and expert in aeronautics; Col. Hiram Bingham of New Haven, Conn., Senator, formerly in the air service and member of the Senate Committee on Military Affairs; Hon. Carl Vinson of Milledgeville, Ga., member of the House Committee on Naval Affairs; James S. Parker of Salem, N. Y., Chairman of the House Committee on Interstate and Foreign Commerce; Hon. Arthur C. Denison of Grand Rapids, Mich., Judge of the Sixth Circuit Court of Appeals; William F. Durand of Los Angeles, Calif., President of the Institute of Mechanical Engineering, member of the National Advisory Committee for Aeronautics.

The appointment of this board conforms to the proposal made by Acting Secretary of War Davis and brings the War and Navy Departments in harmony, on the necessity to study and investigate aviation.

The inquiry undoubtedly will go into the charges made by Colonel Mitchell and study the whole aviation problem in a broad way in the light of the Shenandoah disaster. It is pointed out that the men named on the board consisting of former army and navy officials, engineers and members of Congress, representing both parties, is of such a character as to win public approval and place the inquiry above partisan grounds.

The feeling in Washington is that the investigation that this board will make at the request of President Coolidge will render unnecessary the proposed Congressional investigation. President Coolidge hopes to have the investigation by the board just appointed completed by late November, so that its report can be presented to Congress when it assembles.

MEMBERS OF THE PRESIDENT'S AIRCRAFT BOARD



Howard E. Coffin

Senator Hiram Bingham

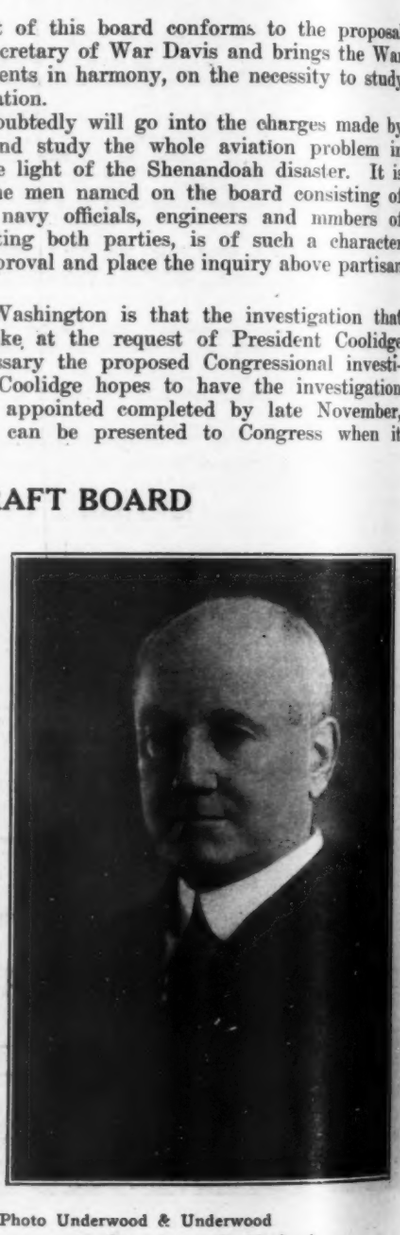


Photo Underwood & Underwood

Gen. James G. Harbord

Loening Amphibian for Langley Field

Recently one of the new Army Loening Amphibians was delivered by air to Langley Field, Norfolk, Va., where it will be permanently stationed as part of the standard equipment of the Army Air Service at that field.

Lieut. George C. McDonald, of Langley Field, was sent to the Loening plant to take delivery of the plane. After only a few minutes' tuning up of the engine, this brand new plane was launched in the water at the Loening airport, East River and Thirty-first Street and, with Lieutenant McDonald as pilot and Grover Loening as passenger, the plane took off for its first flight, fully loaded with 140 gal. of gasoline.

As everything on the plane and its installation was found fully satisfactory in the air, Lieutenant McDonald and Loening decided to proceed at once to Langley Field, and this non-stop flight of 310 mi. was made in 3 hr. 12 min., showing a cruising average of 100 m.p.h., at 1,480 r.p.m. of the inverted Liberty engine. The gas consumption on the way was approximately 23 gal.p.h.

Upon arrival at Langley Field, Lieutenant McDonald pressed the electric button operating the lowering of the landing gear, and proceeded to land on the field, taxiing up to the line, where the aviators were greeted with considerable enthusiasm, not only by the Langley Field personnel but also by a large number of Pennsylvania State National Guard Reserve pilots who are in training there.

During the trip Lieutenant McDonald experimented with the much-talked-of "natural stability" of the Loening Amphibian and was able to fly for fifteen minutes without touching the controls at all, during which time the plane deviated only slightly from a straight course in a long letter "S" and both longitudinal and lateral stability were shown to be inherent, in that no correction at all was necessary. This was found particularly interesting, as the air was quite bumpy at the time and apparently indicates that the major aerodynamical feature of the Loening Amphibian in having the center of gravity at the center of lateral fin area, actually works out in practice to give a remarkably airworthy flying machine.

Representatives of the Army Air Service also expressed themselves as pleased that the initial test hop of this new airplane, upon delivery, was constituted by a major cross-country trip of this magnitude and is considered quite a credit to the mechanics of the Loening plant.

Monsieur Flandin's Visit

M. Pierre Etienne Flandin, president of the Aero Club of France, and a member of the French Chamber of Deputies, sails on his visit to the United States and Canada, on the liner "De Grasse," leaving Havre on Sept. 19 and arriving in New York on Sept. 26 or 27. During his stay in the United States, M. Flandin plans to remain in New York until Sept. 30, proceeding then to Washington on Oct. 1. On Oct. 7 it is planned to return to New York for the International Air Races, going on to Niagara on Oct. 10. M. Flandin hopes to spend at least one day in each of the following cities of Canada—Toronto, Ottawa, Montreal and Quebec. The French executive will return to France aboard the S. S. Paris, leaving New York on Oct. 19. M. Flandin, it will be recalled was formerly French Minister of Air and also Minister of Commerce in the French Government.

Breguet Climb with Various Engines

In addition to the actual horsepower of any given engine, every aviation engine possesses an additional quality which cannot be definitely measured or described. This is the unknown quality which may make one particular engine superior to others of the same general characteristics and rated horsepower. The possession of this quality to a high degree in the new Farman engine (already holder of the World's Duration Record) is illustrated by the following official performance figures of the Breguet 19 equipped with the Farnam, Renault and Lorraine engines:

	Farman	*Renault*	*Lorraine*
Climb to 3000 ft.	2 min. 50 sec.	4 min. 25 sec.	4 min. 35 sec.
Climb to 6500 ft.	5 min. 59 sec.	9 min. 36 sec.	9 min. 13 sec.
Climb to 10000 ft.	10 min. 01 sec.	15 min. 22 sec.	15 min. 06 sec.
Climb to 13000 ft.	15 min. 46 sec.	23 min. 22 sec.	23 min. 48 sec.
Climb to 17000 ft.	24 min. 25 sec.	39 min. 51 sec.	

During these tests the machine carried a useful load of 2300 lb.

Italy Changes Air Attache

Wing Commander Mario Calderara, Air Attaché of the Italian Embassy at Washington, has been ordered to return to Italy, his place being taken by Commander Scaroni Attache to the Embassy at London.

Photo Underwood & Underwood
Hon. Carl Vinson

Photo Underwood & Underwood
Admiral Frank F. Fletcher

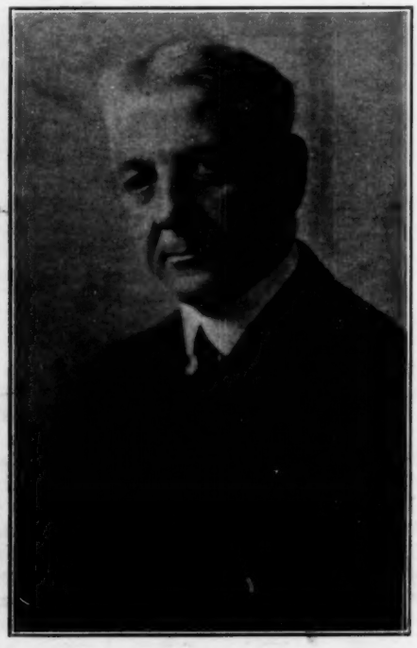


Photo Underwood & Underwood
Hon. James Parker

Community Aviation

By WILLIAM B. SMITH
Surgeon, 118 Observation Squadron

"Why do we stay on the ground?" asks Frederick L. Collins in an article in *Collier's Weekly* for March 21, and he goes on to say "Here in America we talk a lot about flying. But in Europe they fly." These expressions, no doubt, are golden in their truth and the contrast is even more vivid when followed by the thought which Peter Vischer gives us when writing some time ago in the *New York World*, "America is thing written on aviation. But so far as the writer can de- the Cradle of Aviation." One needs only to pick up any periodical or newspaper today and he is sure to find some- termine most of what is written has to do with the subject as a national program and little is said about fostering aviation in a local or community way.

Educate the Public

Whatever our program may be in the future will depend on the concerted efforts of the nation as a whole and the government will have to take the lead in the development of aviation. But it is equally as well a timely thought to look to the community as a very potent factor in bringing about that concerted action. Begin at home and when local enthusiasm runs high the greatest national air service in the world is bound to follow.

Teach the public the ways of aviation the same as they were taught the automobile. Millions of people read daily accounts of things aeronautical; and recently the entire nation followed the great controversy over aviation in Washington with keen interest, but how many of those who read know the intricate workings of a well organized air service. In plain words "What's it all about?" There is no doubt that to the great majority, flying is a most mysterious art, beset with many hazards, exacting of one a charmed life and sure to end sooner or later in certain death for those who participate either as pilot or passenger. How can such an uncertain means of transportation ever become a safe and sane businesslike proposition?

Being Prepared

One of my fellow townsmen not so long ago was positively astonished when I told him that there were eighty men in our local Air Service Squadron who did not fly, but who were very essential in attending to the details of the ships and the field so that the ships might be kept in the air safely and continuously. His astonishment, however, was only symbolic of the millions who can only see the man-in-the-air from the viewpoint of the man-in-the-street.

It would appear, therefore, that to educate the local community in the way of aeronautics; to have the banker and business man feel that a local airdrome will be as much an essential as good roads, electric and steam service are now, would be the fundamental step toward a greater national institution.

Why would the airdrome be the fundamental step? The answer lies in the old adage "Put up the bird house and the birds are sure to come." Among the most important things in establishing an airway is the proper number of well equipped fields for emergency as well as scheduled landings. Wesley W. Stout writing in the *Saturday Evening Post* of March 21 has very effectively compared the landing fields along airways to the garages and filling stations along any state or national motor highway. It is this comparison exactly that should be kept in mind when emphasizing the importance of community aviation. Build within a community good roads with good service stations and complete accommodations and big business will come that way for the construction of trunk-line motor roads will be in that direction. Likewise, build a good aviation field and an airway will eventually pass through the community.

Commercial aviation must come. Our postal air service has surely proved that it is not only possible, but a very practical means of transport for long distances. When it does come why should not any community be a regular stop. Why should not one or two planes land and take off every day from its field and the products and mail of that vicinity be exchanged thousands of miles distant as a part of the regular events in the course of a day? A community ten years hence without an airdrome will be considered in the same category as one today without a railroad, electric line or a good state highway. The more complete the airdrome, and the more efficient and enthusiastic those superintending its affairs the greater will be the air terminus. Large, safe and efficient airdromes are not built over night and consequently that community which takes upon itself today the responsibility of aeronautics is placing itself in bold type upon the airways map of tomorrow, whereby it will have its part in the future economies of the nation and become a pillar in the greatest of all national systems of airways.

A concrete example may be taken from what Hartford, Conn., has done in only a few years. And what is being done in this city is also being done in a few other cities of similar size, but unfortunately only a few. It could be done in many more. About three years ago a handful of public spirited citizens of this city felt the need of incorporating aviation into the affairs of the community. Some of these men were ex-pilots. They secured a field, cleared it and built it and formed a squadron. Today Hartford has one of the finest airdromes in this country. The physical conditions are good for landing and taking off, making it possible for any type of ship to land on the field. There are three fireproof hangars, one a municipal hangar and the other two belonging to the 118 Observation Squadron of the Air Service of the Connecticut National Guard. This squadron has five ships in first class condition and ready to fly. There is twenty-four hour service at the field making it possible for a ship to land any time for repairs or fuel. Ships from the field fly over the city every day. The field is well marked, is situated on the Connecticut River and is but eight minutes from the center of the city and the railroad station.

Good Publicity

In this manner aviation is kept constantly before the eyes of the public. Lectures are given from time to time to which the public is invited, and I might add to which they well respond. An aviation meet is held each year in which are entered ships from all important fields. Aviation is given plenty of newspaper publicity. And finally and most important; there is a civil organization in which membership is not limited to those of the active squadron, but to anyone really interested in the subject.

Goal Still in View

All this has been done in the past four years in a community a little larger than one hundred fifty thousand. The goal is not yet attained, but the people of Hartford are being educated in matters aeronautical so that when in the near future we have realized our dreams of an extensive system of commercial aviation, this city will be found on the schedule ready to give and receive generously of its share in the cause of aeronautics. This is community aviation in the truest and strictest interpretation of the phrase. When every city of similar size has its airdrome well appointed and staffed, with smaller towns offering simply a well cleared, well marked field for emergency landings, we will not only be talking about flying, but we will be flying. The bird houses will have been built and the birds will have come.

The Boeing PB1

A Patrol Type Flying Boat with Tandem Engines

The PB1, Boeing Patrol-type seaplane was designed and built by the Boeing Aircraft Factory, Seattle, Wash., for the United States Navy, and is classed under the tractor biplane boat type.

The plane is slightly larger than the PN9 in construction, having a full load weight of 24,000 of which 12,531 lb. or 52.3 per cent is useful load. The wings have a total area of 1301.5 sq. ft. with a span of both upper and lower wings of 37 ft. 6 in., and a chord of 11 ft. The gap between the wings is 13 ft. 5 in., and the set angle of incidence is zero. There is no stagger or sweep back and while the upper wing is flat there is a dihedral of 4 deg. on the lower.

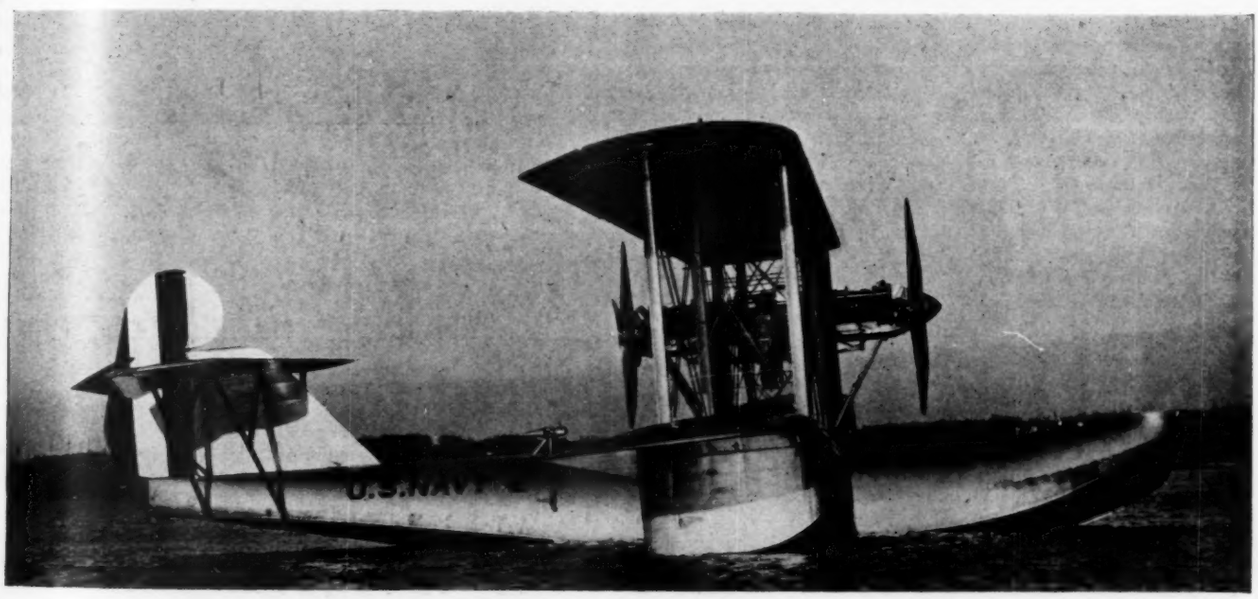
The hull of the PB1 is of the NC type with an F5L tail. The construction of the hull is one of the outstanding features of the plane, it being constructed of duralumin up to the water line, above which is plywood, this unique design reducing the weight and eliminating much soakage.

The arrangement of the hull is very similar to that of the PN9. In the bow is the navigator's compartment, a small space so fitted and equipped that the navigator can make observation of both celestial and terrestrial objects to obtain the ship's position, the course to be steered and all other vital factors which are plotted on a chart board within the compartment.

Behind the navigator's compartment and adjoining by a small door, is the pilot's cockpit well forward in the hull and equipped with dual control. As in the PN9, the gasoline tanks are situated in the center portion of the hull aft of the pilot's cockpit, together with the mechanic's station, behind which is located the radio compartment, the equipment of which is similar to that on the PN9.

The design of the PB1 incorporates several outstanding features, important among which is the placing of the two 800 hp. Packard engines in tandem between the wings, thus enabling one of the engines to be shut down for minor adjustments when in flight. Each engine drives a four bladed propeller built by the Hamilton Propeller Co.

The characteristics of the PB1 are especially interesting when compared with those of the historic NC type which made first transatlantic flight in 1919. The weight of the NC was 28,000 lb. and its range in the neighborhood of 1600 mi., whereas the Boeing PB1 has a fully loaded weight of 25,000 lb. and a range of 2500 mi., nearly 1000 mi. greater. Further, the NC wing span was 126 ft. while that of the new PB1 is but 87 ft. 6 in. Of the total weight, 11,000 lb. can be carried as fuel, representing nearly 1800 gal. of gasoline. Five men compose the crew of the plane, though accommodation is available for seven. The plane has a maximum speed of 125 m.p.h., a stalling speed of 66 m.p.h. and a cruising speed of 80 m.p.h., and is able to climb to 5000 ft. altitude in 10½ min. It can remain in the air full speed 11.9 hr. or at cruising speed 23.7 hr.



An excellent view of the Boeing PB1 showing the tandem engine arrangement

Naval Board to Investigate Shenandoah Accident

A court of inquiry to investigate the Shenandoah accident, with Rear Admiral Hilary P. Jones, chief of the Navy's general board, as its president, has been appointed by Secretary Wilbur.

Those who will serve with Admiral Jones in conducting the inquiry are Capt. Frank H. Clark, aid to the Assistant Secretary; Capt. Lewis B. McBride of the Navy Construction Corps, Comdr. John H. Towers, Lieut.-Comdr. Ralph C. Pennoyer, Capt. Paul Foley, director of the experimental laboratory at Bellevue, D. C., and Lieut.-Comdr. M. R. Pierce. Captain Foley will be Judge Advocate of the court and Lieutenant Commander Pierce will be his adviser.

The Shenandoah board will sit at Lakehurst, N. J., but no date has been set for its convening.

Admiral Jones is senior member of the general board and formerly was commander-in-chief of the fleet. Commander Towers is a naval aviator with twelve years' experience and was commander of the transatlantic flight made by the Navy in 1919. Lieutenant Commander Pennoyer also is a naval aviator and a lighter-than-air pilot. He was the naval inspector of the airship Los Angeles while it was under construction in Germany, and he served also in England during the construction of the R38 (the ZR2). Lieutenant Commander Pierce is a lighter-than-air pilot and regarded as thoroughly familiar with the construction of the Shenandoah.

British Schneider Cup Entry

Great Britain to be Represented in the Schneider Cup Race by the Supermarine Aviation Works

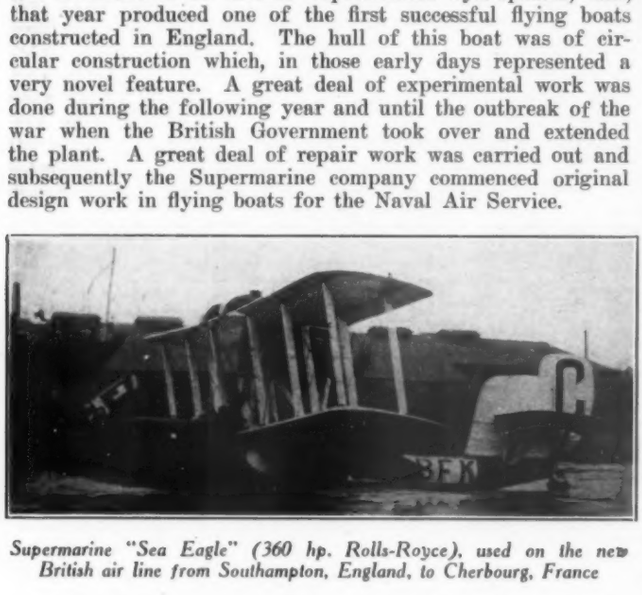
One of the British entries in the Schneider Cup Trophy to be held at Baltimore on Oct. 24, is according to news just received, to be a float type seaplane designed and constructed by the Supermarine Aviation Works of Southampton, England. The pilot will be Capt. H. C. Baird who has been with the Supermarine Company for a number of years as chief pilot and it will be remembered that it was he who flew the Sea Lion, Britain's entry in the 1922 Schneider Cup Race, to victory at Naples, Italy, which resulted in the bringing of the Cup to England that year. Furthermore, it will be recalled that, on the occasion of the victory of the United States Navy at Cowes in the 1923 race for this annual seaplane contest, Captain Baird put up a good performance against the Navy-Curtiss, coming in third.

To Arrive Shortly

Arrangements are now completed for the plane together with its designer, R. J. Mitchell, and Captain Baird, to travel to America on the S.S. Minnewaska arriving here during the first week of October, and it is known that the Supermarine company expects very excellent performance from their latest racing product and it is hoped therefore that very fine competition will be set up in Baltimore.

Supermarine History

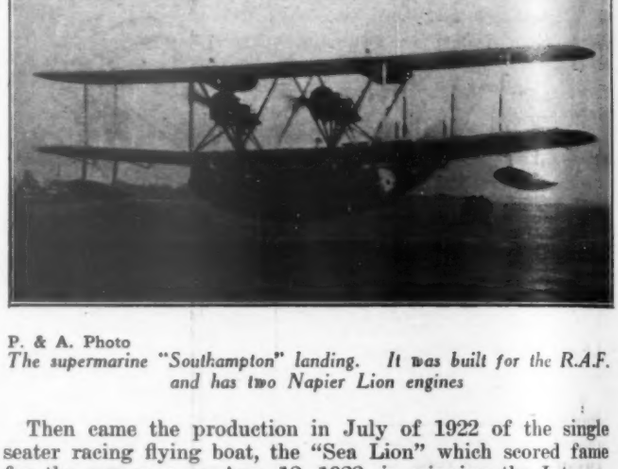
A brief history of the activities of the Supermarine Aviation Company will not here be out of place. Founded at Woolston, England, in 1912, the company commenced with the construction of several experimental hydroplanes, and, that year produced one of the first successful flying boats constructed in England. The hull of this boat was of circular construction which, in those early days represented a very novel feature. A great deal of experimental work was done during the following year and until the outbreak of the war when the British Government took over and extended the plant. A great deal of repair work was carried out and subsequently the Supermarine company commenced original design work in flying boats for the Naval Air Service.



Supermarine "Sea Eagle" (360 hp. Rolls-Royce), used on the new British air line from Southampton, England, to Cherbourg, France

On the cessation of war, the company turned its attention in part to the design of seaplanes for commercial purposes and in 1919 designed and operated the "Channel" type flying boat between Southampton and the Channel Islands. In September of that year the Supermarine unsuccessfully entered a flying boat in the Schneider Cup Race held at Bournemouth, England. As an example of the excellence of the Channel type a number of these were exported to Norway under terms with the Royal Norwegian Naval Air Service and also to a private company in Norway for the purpose of mail carrying.

In 1920 a commercial Amphibian flying boat, claimed to be the first such ever constructed was designed and entered in the Air Ministry Competition for Commercial Aircraft which was held at Martlesham and Felixstowe and there was awarded a large prize on account of the reliability, and excellent performance and seaworthiness. The durability of the constructional features was also commended. During the following year the company became interested in the design and construction of motor launches and achieved considerable success in this line, at all times maintaining its aeronautical activities, as is characterized by the fact that during this same year the Supermarine Works turned its attention to the production of a flying boat especially designed for deck-landing on ships at sea, and in 1922 turned out the Seagull type deck landing flying boat which was immediately ordered in large numbers by the Air Ministry.



P. & A. Photo
The supermarine "Southampton" landing. It was built for the R.A.F. and has two Napier Lion engines

Then came the production in July of 1922 of the single seater racing flying boat, the "Sea Lion" which scored fame for the company on Aug. 12, 1922, in winning the International Schneider Cup Race and thus bringing the Trophy from Italy to England only to be again removed and this time brought across the Atlantic by the United States Naval fliers in the following year. It is interesting to note that on the occasion of the 1922 contest at Italy the Supermarine Sea Lion succeeded in breaking all previous records for flying boats and as a result the company was awarded the first official worlds records in this respect, granted by the F.A.I. for marine aircraft.

Commercial Amphibians

The company has to its credit the production of several very interesting twin engined flying boats, of which special mention may be made of the "Sea Eagle" a commercial type amphibian of good performance, and since that time the company has devoted its attention almost entirely to the design of large amphibians for the British and other governments. Notable among recent products is the Swan which is claimed to be the world's largest amphibian flying boat. This boat was successfully launched on March 25, 1924, and was followed shortly by the Supermarine Scarab which is also an amphibian flying boat designed for bombing and reconnaissance work and was supplied to the Spanish Navy, and used successfully in the recent campaign against the Riffs, thus being the first example of the use of an amphibian in active service.

The Supermarine Aviation Works appear at the moment to be flourishing with orders placed from various parts of the world including the production for the British Royal Air Force of the Southampton, a twin engined flying boat the details of which are not yet fully available. The float type

The Supermarine "Sea Lion," 450 hp. Napier Lion engine, which won the Schneider Cup for England in 1922 and lost to the U. S. Navy in 1923, when the Cup was last contested.

seaplane which is now being designed for the Schneider Cup this year is an entirely new departure for the Supermarine Works, this company having devoted its time in the past almost entirely to the production of flying boat types. The arrival of our guests from the other side will therefore be looked forward to with the greatest interest.

New Orleans—Chicago Air Mail Route

Petition for an overnight air mail service between New Orleans and Chicago, with stops at Jackson or Vicksburg, Miss., Memphis and St. Louis, was received by Postmaster-General New.

The route would approximate 1,250 mi. and would, under the proposed schedule, require the equipment of a lighted airway and lighted flying fields.

Under the schedule, proposed departure from New Orleans would be made at 7:30 p. m., with a stop at Jackson or Vicksburg about 9:45 p. m., Memphis at 12:22 a. m. and St. Louis at 3:44 a. m., with arrival at Chicago at 7:37 a. m. The southbound trip would be started from Chicago at 8 p. m., with stops at St. Louis at 11:13 p. m., Memphis at 2:32 a. m. and Jackson or Vicksburg at 5:07 a. m., with arrival at New Orleans at 6:52 a. m.

Air mail service officials are considering the proposed schedule and if the petition is approved bids to be opened in sixty days thereafter will be called for.

It is estimated that to light an airway between New Orleans and Chicago for night flying would cost in the neighborhood of $250,000.

Mercerized Cotton Airplane Cloth, Grade A

Circular No. 270 of the Bureau of Standards covers United States Government Master Specification No. 285a on mercerized cotton airplane cloth, Grade A. It gives, in addition to the detailed specification, methods of test and inspection. This cloth is to have 80 threads per inch in both warp and filling, to weigh 4.5 oz. per sq. yd., to be made of No. 60 yarn and to have a breaking strength in both directions 80 lb. per in.

Chicago Postoffice to Have Landing Platform

It is understood from Postmaster Arthur C. Lueder of Chicago that the plans for the new $15,000,000 post office include the installation of a landing platform for mail airplanes. The platform will be two city blocks in length and provide sufficient space for landing the standard types of mail planes now employed. The mail from New York to Chicago would, with the installation of this platform, be speeded by one hour, being the time now taken in transferring the air mail from Maywood Field to the city. Congress will be asked to approve the plans during the coming session.

If this plan is carried out, it will constitute the first example of a suggestion of long standing both in this country and elsewhere, for the bringing of air transport to the very heart of a city and thus eliminating the present very large percentage of total time now occupied in handling air traffic at the usual out-of-town terminals.

An All Metal Airship for the Navy

W. B. Mayo and engineers of the Ford Motor Co. in a recent conference with Secretary of the Navy Wilber offered to give the Department their plans and specifications for a small all-metal airship and to cooperate in its construction, the secretary announced on Monday. This offer is now under serious consideration, the Secretary said, by the Bureau of Aeronautics.

The all-metal ship, said to be composed chiefly of duralumin, is a single compartment ship suitable for either hydrogen or helium, having a diaphragm above which the lifting gas is enclosed. This diaphragm permits the expansion of gas at high levels and is said to insure a safety factor of six at ten thousand feet.

The Ford engineers, who have been experimenting with the elemental theories for four years, believe the plan thoroughly feasible and practical for naval operations. The ship is said to be about 150 ft. in length and 50 ft. in width, the whole being a somewhat egg shaped craft, with a single control car attached to its body. Driven by two engines, it is estimated that its speed would be 60 mi./hr., and that its cruising radius would be about 2000 mi., with hydrogen; with helium it would be less.

The weight of the single metal cover, which is also the gas container, is designed to be no heavier than the envelope of the Shenandoah, plus the inner covers, wiremesh, and gold beater's skin gas bags.

The total construction cost was placed at about $300,000 for a single airship of this new type. The size is relatively an eighteenth of the total volume of the Shenandoah.

From the informal discussion given the Press by Secretary Wilbur, it is felt that the Naval head was deeply interested in the plan and desired a thorough investigation by his aeronautical experts. The reduced size, cost and the increased safety factors would appears to make for increased use for observation work with the fleet, which the Secretary believes is the only practical value of lighter-than-air craft to the Navy.

New French Experimental Seaplane

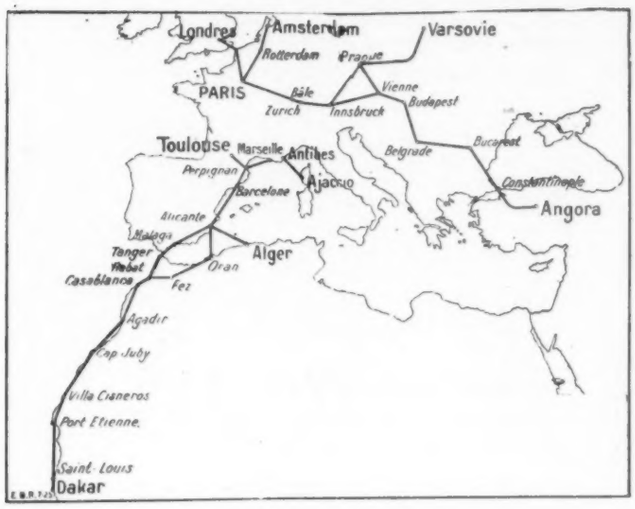
The Percheron Co. has recently built for the French navy an experimental type of seaplane which it is claimed is very simple to maintain and to assemble. The machine is a two seater fitted with a 400 hp. Lorraine Dietrich engine and is designed for observation and photographic work.

The cellule is of double monoplane type, with 566 sq. ft. of surface, the lower wing resting directly on the floats with no intermediary struts and the upper wing resting directly in the top of the fuselage. The wings are of the "multilongeron" type with plywood covering. There are only a few ribs and no interior cross wires. Two braces extend from the fuselage to the lower wings where they are attached to the pontoons while a single strut runs out from the pontoons to the upper wing. The upper wing with a span of 49 ft. 2 in. is quickly demountable so that the plane can be stowed on ship board.

The fuselage is made up of four longerons with Warren truss bracing which eliminates the necessity for cross bracing wires. The whole is covered with ply wood. The fuselage is fastened to the wings by centering studs to which bolts are screwed. The whole nose of the machine which contains the Lorraine Dietrich engine, the radiator, the oil reservoir, the instrument board and the engine controls, is detachable by undoing six bolts. The engine bed is made of duralumin, as is also the detachable nose.

The tail surfaces are made entirely of plywood. The controls are manipulated through push and pull rods. The pilot is seated in front of the leading edge while the observer sits behind the trailing edge. Each seat is fitted with a machine gun and the plane can be controlled from either cockpit. The space between the two is reserved for the camera. Oblique photographs are taken through the side of the fuselage. The useful load is 1000 lb., with 4 hr. of fuel, the speed is 110 m.p.h. and the ceiling 16,000 ft.

French Airlines Actually in Service, July 1, 1925



Operating company	*Lines operated*	*Length mi.*	*Frequency*	*Airplanes employed*
Compagnie "Air-Union," 56 bis, rue de Chateaudun	Paris-London	233	Twice daily	Farman F60 (Goliath Salmson) (2 Salmson 9GM engines, 260 hp.) Farman F61 (Goliath Renault) (2 Renault 12Fe engines, 300 hp.) Breguet 14T bis (1 Renault 12Fe engine, 300 hp.) Spad 33 (1 Salmson 9GM engine, 260 hp.)
Ste Cie de Transport aerien 167, rue de Silly, Billancourt	Paris-Brussels-Amsterdam	286	Daily except Sunday	Farman F61 (Goliath Renault) (2 Renault 12Fe engines, 300 hp.) Farman F70 (1 Renault 12Fe engine, 300 hp.)
Compagnie Internationale de navigation aerienne 22, rue des Pyramides	Paris-Strassburg-Zurich Innsbruck-Prague	832	Daily except Sunday	Potez IX (1 Lorraine-Dietrich 12Da engine, 360 hp. Spad 66 (1 Lorraine-Dietrich 12Da engine, 370 hp.) Gaudron C81 (I Lorraine Dietrich 12Da engine, 370 hp.) (2 Salmson 9GM engines, 260 hp.) Gaudron C61 bis (1 Hispano-Suiza 8 Ab engine, 180 hp.) (2 Salmson 9GM engines, 260 hp.) Farman F4x (3 Salmson 9AZ engines, 300 hp.)
	Prague-Warsaw	329		
	Prague-Vienna-Budapest-Belgrade-Bukarest-Constantinople-Angora	1399		
Compagnie "Aeronavale" 6, rue de Villiers, Levallois-Perret	Antibes-Ajaccio	149	Triweekly	Liore et Olivier flying boats. Leo 13 (2 Hispano-Suiza 8Aa engines, 150 hp.)
Compagnie Generale d'Enterprises Aeronautiques 79, avenue Marceau, Paris	Toulouse-Perpignan-Barcelone Alicante-Malaga-Tangiers-Rabat-Casablanca	1146	Daily	Breguet Latecoere (1 Renault 12Fe engine, 300 hp.) Farman F70 (1 Renault 12Fe engine, 300 hp.)
	Casablanca-Agadir-Gap Juby-Villa Gisneros-Port Etienne-Saint-Louis-Dakar	1771	Weekly	
	Casablanca-Rabat-Fez-Oran	469	Weekly	
	Marseilles-Perpignan	172	Daily except Monday	Liore et Olivier flying boats.
	Oran-Alicante	190	Four times per week	Leo 13 (2 Hispano-Suiza 8Aa engines, 150 hp.)
	Algiers-Alicante	298	Weekly	Leo 133 (1 Renault 12Fe engine, 300 hp.)

Mitchel Field Race Notes

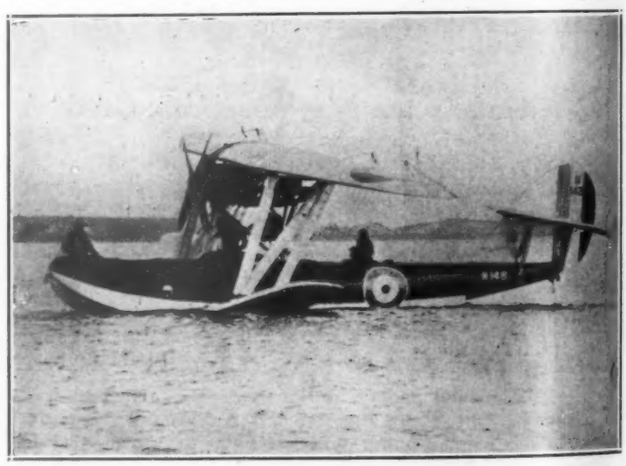
Mile high parachute jumps in an attempt to beat the world's record will be a feature of the New York 1925 Air Races at Mitchel Field. Serg. Randle L. Bose and Corp. Arthur Bergo, Army Air Service aces will compete against the field. They are assured of stiff competition from the Navy team of Starr and Ford from Lakehurst who have specialized in double jumps and are also noted for their individual feats.

Sergeant Bose of Mitchel Field is the holder of the world's record with a drop of 1800 ft. before opening his parachute. Corporal Bergo, who made the tests with Sergeant Bose dropped 1500 ft. and together, these parachute jumpers are recognized as the greatest in the U. S. Army Air Service and probably in the world. In the meet at Mitchel Field they will drop from a height of a mile or more in the air and will endeavor to establish a new record for jumping distance before opening the parachutes. A number of civilian jumpers will send in their entries for the event shortly and it is expected that these will include that of "Dare Devil" Ben Grew, of Chicago, who has made repeated claims that he can beat Bose's record.

That the meet will attract the greatest number of aircraft that have ever gathered in one place is already assured and letters are coming in every day to the contest committees from civilian fliers signifying their intention of flying to the races.

The veteran pilot, "Casey" Jones will head a squadron of Curtiss planes which will take part in the meet, Cy Caldwell will fly a Martin from Cleveland, Cliff Webster is going to fly a Loening plane, C. B. D. Collyer and E. D. C. Herne will take Skywriting planes to Mitchel Field for a demonstration during the races, Dick Depew and Burr Leyson will fly Fairchild Camera Planes, Morris Titterington a Pioneer Instrument test ship, R. B. C. Noorduyn a Fokker, Col. H. E. Hartney the Sikorsky air transport, and Wallace Kellett in a Farman Sport Model will fly from Philadelphia.

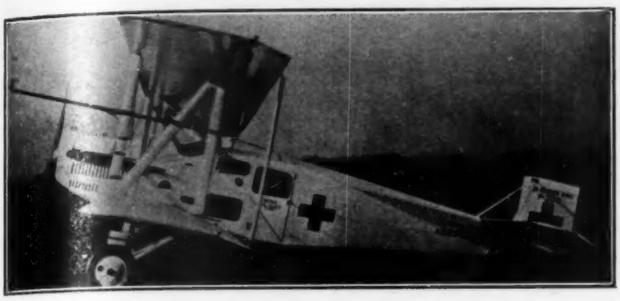
The majority of these well known pilots will have several ships under their command to fly to Mitchel Field and scores of others not so well known will be there on Oct. 8. The Wright Aeronautical Company, Johnson Airplane Co., Yackey Aircraft Co., Decatur Aircraft Co., will all send a number of planes and other concerns will send ships ranging from the tiny craft with motorcycle engines to the giant Remington-Burnelli Air Liner.



The English Electric Co.'s "Ayr" in which the lower wings replace side floats

Mitchel Field will add its thirty planes to the quota of attendants and a squadron of observation planes will come from Langley Field, Va.; pursuit planes from Selfridge Field, Mich.; observation planes from Pope Field, S. C.; bombing planes from Aberdeen, Md.; experimental planes from McCook Field, Dayton, O.; bombing and observation planes from the aviation field at Quantico, Md. Other Army, Navy, Marine Corps and National Guard Flying units will fly to the New York 1925 Air Races and those of the Air Mail planes which are not on duty will be at the races.

The three Curtiss racers which have been built for the government services for the Pulitzer Trophy Race are practically through testing and will be flown in a few days or a week. Lieut. A. J. Williams of the Pulitzer Race in 1923 and holder of the record for the distance, 243.69 m.p.h., will arrive at Mitchel Field shortly to start tuning up the Navy plane for the big race. Lieutenant Williams is better known as a pitcher for the New York Giants and no amount of Naval titles will ever make sport fans call him anything but "Al." He was born in the Bronx and is a graduate of Fordham University.



P. & A. Photo
The Cox-Klemin aerial ambulance designed at McCook Field and produced for the Army Air Service

A number of Governors have already reserved boxes and the foreign embassies in Washington will be well represented. Arrangements are being made to handle the crowd of more than a half million which is expected to attend the races and special transit and police facilities will be provided.

Five flying fields will be used to park the visiting ships during the meet and the Curtiss Company is fitting up two floors of its executive building at Garden City to provide free living quarters for visiting government and civilian pilots. The National Aeronautic Association of the United States will hold its annual convention in New York at the time of the races and headquarters have been established at the Hotel Pennsylvania.

French Entries in the Air Races Set Sail for U. S.

News from Paris indicates that Robert Thierry, who was recently killed, will be replaced by Captain Lemaitre, another well known French pilot, as a contestant and pilot of one of the French planes entered in the Liberty Engine Builders Trophy race to be held during the International Air Races at Mitchel Field early in October. Captain Lemaitre will fly a Breguet Type 19A2 and it is reported that he and Peletier Doisy, who will fly the second French airplane entered in this race, left France for New York on Sept. 14, aboard the liner Rochambeau.

Italian Air Appropriations

The Italian Air Budget for the year 1925-26 totals 449,000,000 lire, ($18,409,000. at the present rate of exchange). The original estimate of the Italian Air Ministry was 720,000,000 lire. A subsequent appropriation increased the total to 539,000,000. On June 30, 1925 there were 60 squadrons totalling 650 airplanes in the service, and this number is to be increased by the summer of 1926 to 90 squadrons with 900 airplanes. According to a Royal proclamation of June 5, 1925, during the next five years the following program will be carried out.

1. Independent air forces, 78 air squadrons.
2. Army cooperation, 57 squadrons.
3. Navy cooperation, 33 squadrons.
4. Service in the colonies, 12 squadrons; totalling 182 squadrons.

Airships are assigned to the navy and captive balloons to the army. The personnel will be brought up to 1930 flying officers, 220 technical officers and 188 administrative officers and 29,226 enlisted men. The air forces will be divided into three districts: The Northwest zone with headquarters at Milan, the northeast zone with headquarters at Bologna and the south zone, including Sicily and Sardinia with headquarters at Rome. In order to carry out this program of expansion an air ministry has been formed with Mussolini as secretary as well as his other posts. General Bonzani continues to serve as under secretary for air.

C. F. Taylor Goes to M.I,T,

C. Fayette Taylor, M. E., has resigned his position as chief power plant engineer of the Wright Aeronautical Corp., of Paterson, N. J., to join the staff of the Massachusetts Institute of Technology. Mr. Taylor has held responsible positions in aeronautical engineering since 1917, and goes to the Institute Jan. 1, 1926, to take charge of research work in aeronautical and automotive powerplants.

No Wright Bros. Medal Award This Year

It has been decided, after due consideration by the award committee, that the Wright brothers medal, offered by the Dayton section of the Society of Automotive Engineers, cannot be awarded to any competitor this year. "No paper was at once in full accord with the conditions of the competition and of such a standard as would justify the award of a prize of the importance of the Wright brothers medal and the committee therefore recommends that the award be withheld for the present year," says an announcement by the committee.

Fostering Air Commerce

One of the staff of AVIATION *who has a desire to become a famous artist drew the above cartoon in a moment of imaginative exhiliration. It is published with apologies to Mr. Ford*

Airports and Airways

Cleveland, Ohio

By Cy Caldwell

The name of Helen has often featured in the world's news, from Helen of Troy to Helen Maria Dawes—funny how you forget them after they become vice-president, isn't it ?—and now the name of Helen again rings across a continent in this great national publication with its 37 subscribers, including free list of 33.

Helen F. Cole, young, pretty, blonde-haired, blue-eyed, is Cleveland's first aerial heroine, a girl as nervy as she is attractive. Seated beside the pilot in a 4-place Dayton-Wright Cruiser carrying two *Press* photographers to the wreck of the Shenandoah, this fair Helen of Ohio noticed the pilot was in difficulties when the plane was over Ava. He pushed the control stick back and forth—and nothing happened to the elevators. As he kept the plane level with the adjustable stabilizer, he did some high-powered thinking, and decided a tapered pin must have slipped out of the controls at a point behind the bulkhead back of the rear seat. He told the girl of the trouble and indicated how by lying sideways on the floor of the cockpit she could reach through a porte in the bulkhead, find the pin, and put it back.

The intrepid girl, as cool as an Eskimo Pie, calmly nodded and did as suggested. She found the pin and held it in place, lying cramped on the floor, while the pilot flew to Duncan Falls and landed. I maintain that a girl like Helen Cole is the answer to the Pilot's Prayer. And I wish I could finish this story in the same romantic vein in which I tried to write it—for I am an old man and haven't had any romance since about the time peg-top pants were considered snappy attire.

But the sad ending is: The pilot who flew that plane was Kenneth R. Cole—Her Husband.

There ! Isn't that a punk ending to a good story ?

Capt. Walter L. Smith, pilot, and Clifford Davis, his 13 year old passenger, were killed near Cleveland when their plane, an old Sopwith 1½ strutter, broke up at an altitude of 5,000 ft. According to witnesses Captain Smith had taken the boy up to try if diving would cure the lad's deafness. The plane was seen to dive steeply. After a short descent the wings buckled and curled up around the fuselage, falling with it, still attached by the wires.

Accidents like this emphasize the need for inspection and licensing of aircraft by competent authorities, bearing in mind especially that airplanes, unlike wine, do not improve with age. We might stop talking about the wonderful future of aviation for just a little while, and devote that time to the proper control of what we have on hand today—and then go on from there. Possibly there might be more of us left to go on with if we did that.

• • •

It is worthy of remark that just a week after Bill Stout received mention in this column he sold his business to Henry Ford. I suppose Henry heard of him through me, which certainly proves the value of advertising in AVIATION.

I'm glad to bring these two men together, for already their association has done a world of good to Henry. He's seen how Bill Stout built the monoplane and has done what he could to improve his car. Nobody could do much to it, but Henry's done what he could. He's lowered the center of gravity, increased the span of the fenders, lengthened the fuselage, put the gas tank behind the engine, where it is in most planes. His fuselages, on both open and closed cars, are all steel. In fact, we might just as well call it the Stout All-Metal.

• • •

A pilot wants to know what to say to the bozo who informs him that he would like to ride "if he could keep one foot on

ELIAS

THE ELIAS AIR MAIL PLANE TYPE M1
Designed for the Night Mail

EXCELS IN

Economy — Reduction of Fire Hazard — Ease of Control — Appearance and Utility — Safety in Landing — Accessibility and Vision — Simplicity — Quick Detachable Features.
With the Liberty engine, the Elias Airmail Plane M-1 carries 66% more payload than the Standard DH mail plane, lands 10 times slower, speeds 9 miles faster and attains the same ceiling.

5.13 Miles per Gallon — Range 460 Miles
Cruising Speed 105 M.P.H.

Fireproof Cargo Compartment — Droppable Tanks — Metal Fuselage — Adjustable Seat — Oversize Wheels — Non Slip Sidewalks — Steerable Skid — Free Air Radiator — Stick Control — Metal Propeller — High Safety Factors and many other desirable features.

Readily Converted for Other Purposes
WRITE NOW FOR PARTICULARS.

G. Elias & Bro., Inc.
BUFFALO, N. Y.

Seven years devoted exclusively to the largest production of commercial aircraft in the U. S.

The New
SWALLOW
The Aristocrat of the Air

PRICE REDUCTION

Immediate Delivery

3-place OX5 Motor $2750.
4-place OXX6 Motor $3150.

THE SWALLOW AIRPLANE MFG. CO.
WICHITA, KANS.

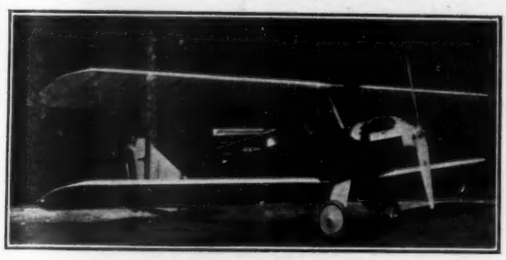
ANZANI
Aircraft Motors

3-CYLINDER 30-35 H.P.

Other Types from 10 to 120 H.P. for commercial airplanes.

Wallace Kellett Co., Inc.

Atlantic Building Philadelphia.



"Comet" with OX-5 Motor

Price $2000.00 f.o.b. Garden City, N. Y.

GUARANTEED PERFORMANCE

	OX-5 Motor	C-6-A Motor
High Speed	90 m.p.h.	112 m.p.h.
Landing Speed	40 m p.h.	43 m.p.h.
Climb first min.	500 ft.	1000 ft.
Pay load	350 lb.	500 lb.

The ideal ship to start an Air Mail Feeder Line.
The strongest ship designed for the OX-5 motor since the Jenny.

G. S. IRELAND

Garden City, N. Y.

the ground." Don't say anything to him. Just take a heavy mallet and drive him into the ground like a tent peg. Don't be rough about it, you know. But make sure he's driven in out of sight.

This fellow and his cousin, who wants to know "if the engine stops could you come down ?" are both modocks—pronounced Mo-dock with the accent on the Mo. According to C. K. Wollam, the famous balloonist and biologist of Goodyear, the Modocks are a tribe of Hottentot bushmen with brains somewhat less developed than that of the cod, whose low retreating brow covers insufficient thought material to enable him to out-wit Mr. Scott, who catches the stupid cod and turns him promptly into Scott's Emulsion. Professor Wollam says the word Modock is derived from the Greek *Mozo,* meaning nothing, and the Latin *Doko,* meaning even less. The Modocks are nearing extinction but solitary specimens still lurk about flying fields. When found, treat as directed above, first sprinkling plentifully with insect powder.

Garden City, L. I.

By A. L. Caperton

S. E. N. Smith of New York City and F. L. Rockefeller also of New York were flown from Curtiss Field on Aug. 22 in an Oriole of the Curtiss Flying Service, Inc., by Arthur L. Caperton, Curtiss pilot, to Lake Placid, N. Y. The flying time was four hours each way. The passengers are very busy men; their families being at the mountain resort and time being scarce, they were well pleased with the fast time of the air journey which enabled them to spend the week-end with their families, to have their golf, and to be at their offices in time for the opening of the stock market at 10 a. m. Monday, Aug. 23. The field at Lake Placid is in excellent shape.

Preparations for the Races are going forward rapidly by all who contemplate entering the various events. An SVA with SPA motor, small-winged Hispano job and the well-known races are being groomed for the commercial events.

Harry Rogers put his fifth Seagull in the waters of Hempstead Harbor after a complete re-building here at the field. His operations now include the use of four Seagulls at Lake George, N. Y.

G. S. Ireland's "Comet" equipped with K6 engine and Dural prop is rapidly nearing completion and he expects to enter this ship in the Races.

The third Pursuit which has been finished has been delivered to the Field and will be put through its paces by Army pilots in the near future.

Wm. Arthur of the Spaulding Construction Co., was a recent visitor to the Field and from his reports of new hangar construction at various points, things seem to be really taking on new life this time.

Earl Sande, America's premier jockey, took his first air ride in an Oriole of the Curtiss Flying Service, Inc. The famous horseman was delighted with the experience and said that he would use planes to go to and from the racetracks in Maryland, Kentucky and New York, where he lives, instead of by motor car as he formerly did. Some of us feel confident of some really worth-while tips on the dogs if Sande's information is worth anything.

The Fokker FIII which was purchased by the Willens Air Line of Detroit arrived under the guidance of Eddie Stinson from that city. Five passengers and luggage were carried and the pilot reported an uneventful journey all the way through. Judging from the few things left in the cabin, a good time was had by all while in the air.

The golf course along the southern end of Curtiss Field is under construction, and while plenty of space is left for ships to come in and go out, pilots are cautioned to look out for the bunkers, etc.

New England Notes

By Porter Adams

Lieut. W. N. Dillon of the Bureau of Aeronautics flew to Boston last Tuesday bringing the Schiff Trophy which was won by Lieut. R. D. Thomas, executive officer of the Naval Reserve Air Station at Squantum, and also bringing Thomas his commission as a senior lieutenant in the Naval Reserve.

* * *

The Army at Boston has received two new JN's from the Air Intermediate Depot at Fairfield, Ohio. The first was

flown to Boston by Lieut. R. Curtis Moffat, first commanding officer of the Boston Airport, and a second was flown in by Capt. J. G. Colgan. Both planes are powered with the model E 180 hp. Wright engine.

* * *

Senator Hiram Bingham inspected Camp Devens by air last week being flown up by Lieutenant Fleet of the Connecticut National Guard, and after his visit returned to his home by air.

* * *

Capt. Thomas Boland flew Assistant Secretary of War, Dwight Davis, to Boston and later took him to his summer home at Dark Harbor, Me., using one of the Army's Loening amphibians. En route to Dark Harbor the Assistant Secretary stopped at Mere Point, Me., for the ceremonies incident to the dedication of the tablet marking the first landing place in the United States of the World Flight. Among the other planes which went to the exercises were the F5L Navy plane assigned to President Coolidge and attached to the presidential yacht, Mayflower. Lieutenant Sprague, commanding the plane, carried several passengers down and reported heavy winds on the down trip which took more than two hours, while the return trip in spite of a landing at Portland took only slightly more than one hour.

* * *

The 26th Division, Air Service, Mass. National Guard, is now at Langley Field, Va., for their two weeks active duty. Approximately one hundred men and officers made the trip down with the unit.

* * *

The total flying time for Boston and vicinity the past week was 93 hr. 24 min. Of this the Navy had 56 hr. 59 min. and the Army 25 hr. 5 min. The National Guard had 10 hr. 20 min.

* * *

We took a trip to New York last week and the big city looked bigger than ever to us after the farm. About the only change we noticed was the addition being put on the Metropolitan Museum of Arts. We asked a worker what it was all about and he said they were putting it up so as to have a place for the new portrait of Mr. Casey Jones. "Ah," we inquired, "Casey Jones, the famous railroad engineer?" "Naw," said the workman with a look of pity and scorn, "Casey Jones, the great propeller salesman." We called the Curtiss Company and tried to confirm this but Casey was away, so we have decided to go back for the national airplane races in October and find out for ourselves.

Hasbrouck Heights, N. J.

The following notice has been received from the Wright Aeronautical Corp. regarding the landing field at Teterboro Airport, Inc., Hasbrouck Heights, N. J., and is quoted for the information and guidance of aviators.

As the work of construction of the new flying field for Teterboro Airport, Inc., at Hasbrouck Heights, N. J., is now underway, you will please be advised that no landing by airplanes within the limits of this proposed field during the construction can be permitted, as it will be both hazardous to the flier and detrimental to the work. Will you kindly give instructions to your people accordingly?

Notice to Aviators, Hydrographic Office, U. S. Navy.

Another Mail Route

A petition signed by postmasters at New Orleans, La., Jackson, Miss., Memphis, Tenn., and St. Louis, Mo., for the establishment of an overnight air mail route between New Orleans and Chicago was received by Postmaster General New Sept. 10. The petition was not signed by the postmaster at Chicago but a similar petition presented to the Department two months ago signed by the postmaster at Chicago and Moline, Ill., and St. Louis, Mo., called for daily service by air between Chicago and St. Louis.

The Postmaster General will, if, after investigating, it is found feasible, advertise for bids under authority of law.

STANDARD J1 AIRPLANES

UNTIL NOV. 1, 1926

We will sell New Standards, less Motor at $650.00. Deliveries will be made in sequence as orders are received. Act quickly as we only have a limited number that we want to dispose of at this price. Wire or mail your order with one-third deposit. The stock of Standards in the country is getting very low. By next summer they will be hard to get at any price. Place your order now and we will make delivery any time up to May 1, 1926. No storage will be charged on your ship. Quick action will assure you a good ship next summer. You will never buy one cheaper. These ships have never been flown.

New Catalogue Ready For Mailing Write for One

SPECIAL BARGAINS ON OX5 — OXX6 AND HISSO PARTS

NICHOLAS-BEAZLEY AIRPLANE CO.

MARSHALL, MISSOURI

LARGEST STOCK IN THE UNITED STATES

The Metal Prop Salesman

Here we have "Casey" Jones with props on his shoulders, sticking out of his pockets and bulging out his brief case full of blue prints. Careful study of the picture will reveal that Casey has been kicked in the shins recently by the envious "Cy Caldwell." But the Chaplin smile remains and his cry as he goes from house to house "Any nice fres'n metal props this morning" seems to come right out of the picture.

Spokane, Wash.

By E. H. Partridge

Plans for an air circus for Spokane, to be held Sept. 26, are being made by Capt. A. E. Easterbrook, Army air instructor and Major John Fancher of the local National Guard aerial unit. Stunts, races and parachute jumps are on the program. To make the meet a success the officers are trying to bring in twenty government planes from outside points. These with three forestry fire patrol ships, three Guard planes and one Army DeHaviland already stationed at the local municipal field would provide sufficient planes for a successful meet. Little trouble in getting the needed planes from outside points is anticipated.

Lieut. Lloyd Barnett, Crissy Field, head of forest patrol work in the west, landed here recently. He commended the local fliers, Lieutenants Mamer, Freng and Priestly on their efficient work in patrolling the twelve national forest of eastern Washington, Idaho and western Montana.

Lieutenant Thorp, Brooks Field, Tex., spent one day at the local field on his way home. He flew from Texas to Seattle.

Lieut. J. A. Macready, famous American flier, and Capt. A. W. Stevens, noted Army aerial photographer, landed on the Guard Field recently and made some photographs of the field and hangars. They left for Glacier National Park to shoot some more pictures and then returned to Spokane en route south.

M. H. McMeekan and Claude Hahn from Minneapolis, were recent visitors. They were on their way to Yakima, Wash., from their home town, flying an OXX6 Standard.

German Airways Development

Statistics of the principal German air lines, Junkers Luftverkehr and Deutscher Aero Lloyd, show that their planes travel 26,700 mi. daily, or 83 per cent of the distance covered by the German railways, according to a report received in the Department of Commerce from Asst. Trade Commisioner W. E. Nash, at Hamburg.

AIRPLANES FOR SALE

We have 333 airplanes that we must sell this year including Standards, Jennies, Canucks, Orioles, D.H.'s, Spads, T.M. Scouts and others. We have a large number of Standards, Jennies and Canucks set up, test flown ready for immediate fly away delivery. Come and take your pick.

NEW STANDARD J-1 AIRPLANES with guaranteed overhauled Hispano-Suiza motors, 150 H.P.	$1500.00
NEW STANDARD J-1 AIRPLANES with new OXX6 motors	1300.00
NEW STANDARD J-1 AIRPLANES with Government overhauled OXX6 motors	1100.00
NEW STANDARD J-1 AIRPLANES with new OX5 motors	1000.00
NEW STANDARD J-1 AIRPLANES with Government overhauled OX5 motors	900.00
NEW STANDARD J-1 AIRPLANES without motor	750.00

These airplanes come complete with tools and instruments and the front seat is built so as to accommodate two passengers. These airplanes have been reconstructed and new longerons, new controls, new wires, new struts, new fittings, new instruments were installed where needed.

LEARN TO FLY

NO BOND REQUIRED FOR SOLO FLIGHTS AND NO CHARGE FOR BREAKAGE

$100.00

ROOM AND BOARD NEAR FIELD AT $10.00 PER WEEK

The splendid response to this special offer (originally limited to June, July and August) permits us to extend it until further notice.

We will guarantee to teach a student to fly and successfully operate an airplane by himself, regardless of the number of flying hours required, and further, to furnish an airplane, free of charge, for the period of one hour for practice flights.

The flying school of the Robertson Aircraft Corporation is one of the oldest and best known in the United States. All of the instructors are ex-army aviators with wide experience and the equipment is the best that money can buy. The flying field is approximately six miles from the city of St. Louis and is easily accessible by railroad, street car and hard surfaced roads. It is the largest and best privately owned field in the country and the International Air Races of 1923 were held there.

Our course includes thorough flying training as well as complete instruction in the over-haul, care and maintenance of both the airplane and motor. The time within which one can learn to fly, varies with the individual; eight to ten hours of dual instruction, stretched over a period of ten days to two weeks should complete the most stubborn case, and from then on, the refinements of the art can be gained only from experience. Commercial aviation is a rapidly growing industry. Don't delay! Enroll now!

ROBERTSON AIRCRAFT CORPORATION

ST. LOUIS FLYING FIELD, ANGLUM, MO.

United States Air Forces

U. S. ARMY AIR SERVICE

A Radio Beacon

By A. M. Jacobs

The announcement of a radio beacon tower to be erected at Mommouth, Ill., under the supervision of the Radio Laboratory, McCook Field, Dayton, Ohio, for the Air Mail Service brings to light another development of the Engineering Division achieved in cooperation with Signal Corps officers stationed there for the purpose. For some time test flights have been conducted by McCook Field in radio finding, using the beacon tower at Wilbur Wright Field as a base. Pilots have flown out and purposely lost themselves, using the direction finding signals as their only guide in returning home. Within a radius of 200 mi. these experiments have invariably been successful.

The former system by which this was accomplished was known as the equi-signal system. The present system, which has been in use for something more than a year, is an outgrowth of the old equi-signal system and is known as the interlocking signal system. That is, the pilot trying to keep his course in the direction of the transmitting beacon hears certain signals. To the right and left of the course, these signals have somewhat the character of the Morse "N" and "A" respectively. On the course, where these two interlocking signals are of the same intensity, a third signal is formed, such as the Morse "T," which is a continuous and unbroken sound. Hearing this constant sound, the pilot knows he is on his course. If the sound becomes broken into either of the two signals before mentioned, he knows he is to the right or left of the course and must try for correction by resetting the nose of his plane until he hears the constant signal once more. One difficulty with the system has been that the flier has had to depend entirely upon his hearing, involving considerable concentration and the possibility of personal error. To correct this difficulty a visual indicator has been devised.

This consists mainly of three small lights, mounted on the instrument board and connected with the receiving set, which flash constantly. The unbroken signal obtained by the interlocking of the two separate signals at a point of equal intensity causes a relay to operate a telephone seelctor which in turn causes a white light to flash. While the white light is flashing, the pilot knows he is on his course. To either side of the course, the componênt signals operate relays which in turn cause the selector to close the circuit, lighting a green or red light to the right or the left of the course, respectively. For economy of space, these light bulbs are of small, Xmas-tree size.

Perfected, the radio beacon is bound to be of inestimable value, especially on set courses such as are used in Airways flying and by the Air Mail service. It is past the experimental stage and success for it is assured. Tests show the visual indicator to be a most promising improvement.

Advanced Flying School

Thirteen student officers who completed their primary flying training at the school at Brooks Field, San Antonio, Tex., have been assigned to the Advanced Flying School at Kelly Field, San Antonio, Tex., to take the course at that school, beginning Sept. 14. Among these students is 2nd Lieut. Henry H. Ogden, Air Service, well known as the companion of Lieut. Leigh Wade, on the Around-the-World Flight. The names of these officers are as follows:

Capt. Edgar O. Sorenson, First Lieut. Ralph F. Stearley, Sec. Lieuts. Walter D. Buie, Donald F. Fritch, Lester M. Rouch, Raymond E. Culbertson, Herbert W. Anderson, Leonard H. Rodieck, John L. Hitchings, Richard W. Gibson, Arthur L. Bump, Jr., Richard G. Herbine and Henry H. Ogden.

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THE TRAINING CAMPS

Chanute Field

By E. A. Alexander

The annual summer training camp for members of the Air Service Reserve Officer's Training Corps, held at Chanute Field, Rantoul, Ill., closes this summer with a record of success behind it. Camps of this nature are doing much to insure the future success of the officer personnel of the Air Service so far as instruction in the fundamentals is concerned. This Reserve Officer's Training Camp attracted cadet fliers from a number of the higher educational institutions. There were seventeen cadets from the University of Illinois; two from Culver Military Academy, Culver, Ind.; and one from Georgia Tech.

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Courtesy N. Y. World

Instruction covered a wide field. There was ground school, gunnery and flying. Ground school covered radio communications, engines, rigging, parachutes, aerial navigation, instruments, photography, meteorology, airplane construction and the service and repair of airplanes, interior guard duty and propellers. Gunnery took up the .45 Colt's Automatic pistol, the Lewis and Browning machine gun, trap shooting, bomb construction and the theory and practise of bomb dropping. A very extensive practise with the .45 pistol was required of the cadets. Mr. Hobson had the lecture periods and Sergeant Holtzman took charge on the pistol range. Out of the entire class of cadets 90 per cent qualified as marksmen, shooting record fire. Of the 90 per cent, 55 per cent qualified as sharpshooters. Actual fire with both the Browning and the Lewis Machine gun was had, as well as the dropping of live bombs from the air. In this latter practise, the cadets showed exceptional ability. None had ever dropped a bomb from the air before, but some of the cadets, bombing from approximately 500 ft. from a DeHaviland were able to make direct hits on a 20 ft. target. One cadet succeeded in bracketing his target twice in succession the first time up with bombs.

Of all the instruction given, however, the keenest interest was felt toward that given in the air. Instruction in the air included navigation, observation, photography, live bomb dropping, radio telephony, pursuit, attack, formation flying, military map making, and acrobatics. The outstanding single flight was a hop made by all the cadets, from Chanute Field

to the experimental station at McCook Field, Dayton, Ohio. The Martin and Curtiss bombers were used to transport the majority of the cadets, while a few of them traveled in DeHavilands. An inspection trip was made at McCook through the museum and the experimental plants. The cadets examined the new barrel type engine on the test blocks at McCook, as well as several other new engines being tested at that place. A short hop was made to Fairfield, where an inspection was made of the Barling Bomber.

On this trip one of the cadets established the camp altitude record by rising to 20,000 ft. in a specially equipped DH. No attempt was made by any of the cadets to beat this record on account of the low temperature of the air at that altitude. The return was made by some of the planes by way of Indianapolis and cities of lesser size lying between the two fields. The practical value resulting from such a trip lay in the actual sight of the things that aeronautical engineers are doing for aviation at the experimental station at McCook. The trip was a revelation of aeronautical progress. The flying time at camp approximated an hour a day. The last day of the camp was given over to a two hour session of acrobatics.

The cadets wish to express their appreciation to the Officer's Club and the ladies of the Post for the kindnesses shown them while at camp. And every one interested in aviation will wish to thank Major Kirby and his Staff for their efforts toward furthering the welfare of the Army Air Service at Chanute Field. Much credit is due Lieutenant Lowe, operations officer of the R.O.T.C. camp for the cooperation he secured and maintained with the Post Technical Departments in the interests of the R.O.T.C. camp. Lieutenant Lowe also had charge of Attack instruction at the camp. Lieutenant Weikert directed in Observation, with Lieutenant Hicks instructing in Bombing and Photography, and Lieutenant Towle in charge of Pursuit. These officers constituted Major Kirby's immediate staff, and were directly responsible for the administration of the schedules as outlined by the commandant.

Army Air Orders

Sec. Lieut. Walter Edwin Lees, A. S. Res., Dayton, to active duty McCook Field, reverting to inactive status Sept. 28.

Maj. David Breed Lindsay, A. S. Res., St. Petersburg, to active duty Washington, reverting to inactive status Nov. 1.

Sec. Lieut. Herbert K. Baisley, A.S., Chanute Field, to Scott Field.

Spec. Or. 127, assigning Sec. Lieut. Stewart W. Towle, jr., A.S., to Scott Field, amended to direct him to report to Commanding Officer, Chanute Field.

Following officers, A.S., from Brooks Field to Kelly Field: Capt. Edgar P. Sorenson, First. Lieut. Ralph F. Stearley (Cav.), Sec. Lieuts. Walter D. Buie (Inf.), Donald F. Fritch (Field Art.), Lester M. Rouch (Field Art.), Raymond E. Culbertson (Field Art.), Herbert W. Anderson (Coast Art. Corps), Leonard H. Rodieck, John L. Hitchings, Richard W. Gibson, Arthur L. Bump, jr., Richard G. Herbine, Henry H. Ogden.

First Lieut. Aubrey Fred Diamond, A. S. Res., Pittsburg, to active duty Wright Field, reverting to inactive status Sept. 27.

Capt. George Ralph Gaenslen, A.S. Res., San Antonio, to active duty San Antonio, reverting to inactive status Sept. 28.

First Lieut. James Robert Homer Akers, A.S. Res., San Antonio, to active duty Kelly Field, reverting to inactive status Sept. 28.

Sec. Lieut. Frederick Harper Wilson, A.S., Washington, to active duty Brooks Field, reverting to inactive status March 11.

Sec. Lieut. Jeffrey Raymond Starks, Washington, to active duty Brooks Field, reverting to inactive status March 11. Lieutenant Starks' orders of Aug. 4 revoked.

First Serg. Thomas Turner, West Point, retired.

Tech. Sergt. Lewis Abott, A.S., Kelly Field, retired.

Capt. Harry Cornish Sigourney, A. S. Res., Washington, to active duty Kelly Field, reverting to inactive status Sept. 27.

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U. S. NAVAL AVIATION

Naval Academy

The regular four year course at the United States Naval Academy at Annapolis consists of 5,880 hr. of studies, recitations and examinations, and 748 hr. of drills. On the above total 672 hr. deals directly or indirectly with aeronautics, approximately 11 per cent. At the present time there are 18 officers and 46 enlisted men detailed to the Naval Academy as instructors in aeronautics. There are four H16 and four F5L flying boats, one Vought VE7 seaplane and one Huff-Daland seaplane, as well as a large amount of guns, engines etc. for use in this instruction. The following table shows the assignment of the theoretical subjects by hours to the various departments:

Departments	*Subjects*	*Hours*	*Total hours*
Seamanship and Flight Tactics	Aviation History	3	
	Aircraft Communications	4	
	Aerology	8	
	Scouting	12	
	Examinations	8	35
Navigation	Navigational Instruments	2	
	Aerial Navigation	10	
	Examinations	4	16
Engineering and Aeronautics	Structure and Rigging	8	
	Engines	10	
	Examinations	6	24
Electrical Engineering and Physics	Theory of Flight	8	
	Examination	2	10
Ordnance and Gunnery	Ground Gunnery	15	
	Bombing	15	
	Examinations	6	36
	Total		121

The practical work is given in the following table:

Seamanship and Flight Tactics	*Hours per Midshipman*
624 flying hours for 150 midshipmen. (4 to a seaplane) as passenger observers in duties of second pilot, radio man, gunner and mechanic, and navigator. Instruction in rules of the road; controls, water handling, but short of solo flying; sending and receiving radio messages; target practice; taking sights; plotting positions and intercept problems. (Four hours in each position.)	16
Electrical Engineering and Physics	
Radio code practice and examinations	44
Ordnance and gunnery	
Range gunnery	32
Engineering and aeronautics	
Structure and rigging	10
Engines	24
Total hours	126

The following table gives a summary of the total time devoted to aeronautics:

		Hours
(a)	Recitations, lectures, and practical work in purely aviation subjects	247
(b)	Assigned study periods	84
(c)	Lectures in August (nights)	12
	Total	343
(d)	Drills not solely connected with aviation but for tests in aptitude	72
	Grand Total	415

Navy Air Orders

Lt. Albert R. Buehler det. Aircraft Sqds., Bat. Flt., to U.S.S. Pennsylvania.

Lt. George F. Chapline det. temp. duty McCook Field, Dayton, to Aircraft Sqds., Battle Flt.

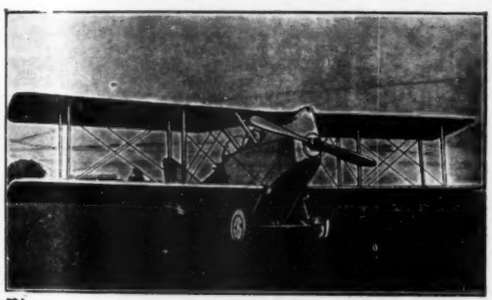
Lt. William M. Fellers det. Aircraft Sqds., Battle Fleet, to Bureau Aero.

Lt. Virgil V. McKenna det. Bu. Aero to Nav. Insp. Airc., Curtiss Aeroplane & Motor Corp., Garden City.

Lt. (jg) John V. McElduff det. Nav. Air Sta., Pensacola, to U.S.S. Mahan.

Ch. Mach. Walter F. Marriner det. Aircraft Sqds., Setg. Flt., to U.S.S., New York.

Lt. (jg) Harold F. Fick det. Torp. & Bomb. Plane Sqd. One, Aircraft Sqds., Setng. Flt., to U.S.S. New York.



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The Aeroplane

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PUBLISHER'S NEWS LETTER

The purpose of Colonel Mitchell's continuous bombardment of the Army and Navy has been achieved. He has demanded in and out of season an impartial investigation of our national air policy. The appointment by the President of an investigating committee will compensate for anything that happens to "Bill" as he is fraternally known throughout the Service. Even his sentence to dismissal from the Army will probably be of little consequence to him if the principle of a single Department of Defense is ever put before the public. Of course, the Army must preserve discipline, and no officer can violate orders and regulations, but once Admiral Sims took a chance and did not get thrown out. What he wrote President Roosevelt about the gunnery of the Navy was perhaps no less critical than the blasts from the mesquite fields of Texas.

* * * *

Objection was made in Washington to more investigations on the ground that there had been enough to bring out everything that could be uncovered. Of all the enquiries, only one made any recommendations and these were just what were to be expected from a Navy Board. The other hearings were informative only. The testimony given at the previous hearings can be used by the new group as a basis to develop a national air policy. Whether or not the Senate and the House will be satisfied with the findings of the President's selections remains to be seen. At any rate, the country is sure to get an opportunity to judge the facts.

* * * *

When the struggles for recognition of aviation in both the Army and Navy are recalled it will be noted that the resistance to any changes has been continuous. To get aviation separated from the Signal Corps where it was regarded as a new means of communication required years of effort and argument on the part of the so-called "air enthusiasts." The Navy held out to the last ditch against any grouping of its air activities under a separate bureau. But a recognition of the importance of aircraft has been forced on the Army and Navy by events abroad and in this country. While it is still regarded in official circles as an adjunct and an auxiliary service, there is no doubt but that the public is convinced that it deserves a wider field than the subordinate position it now occupies.

* * * *

The future will regard the fate of Colonel Mitchell as inconsequential compared to the results that he has accomplished. While it is always a disappointment to an officer not to round out his thirty years of service and be able to retire with a perfect record, the issues raised by the so-called "insubordination" are so important that Colonel Mitchell, "dismissed," will be a greater figure than Colonel Mitchell, "retired." His ability as a writer and publicist will not lay dormant long, it is safe to predict. So far as can be judged, the country by a very great majority is with him; not as to the accuracy of his statements but from sheer admiration of his courage. It should not be overlooked that there are five million ex-soldiers in the Country and deep down in their hearts there burns a fire of dissatisfaction with the present handling of our country's defense. The resolutions adopted by several American Legion posts endorsing Colonel Mitchell's stand is an indication of this sentiment.

* * * *

It would require a volume of discussion to cover fully the points raised by the broadsides issued by the Air Officer from Fort Sam Houston. When it is recalled that the Secretary of the Navy on the day the Shenandoah was destroyed used the occasion to give out propaganda against aircraft, the provocation to the chief proponent of military aviation in this country will be apparent. The regular channels for suggestions as to an aircraft policy had been tried in vain. The Lassiter report remains buried to this day. General Patrick's recommendations have been routed to the pigeon hole of dead hopes. The use of drastic, even heroic, measures was the only course open to the man who commanded the largest air force ever concentrated in war time. He exploded with wrath and such bursts are usually charged with uncontrollable forces. The country will soon forget any facts that were exaggerated or demand proof of statements that are not demonstratable without war. It will remember that battleships were sunk by aerial bombs when a former Secretary of the Navy said they were unsinkable. It believes that the Army and Navy have only developed the Air Service protestingly.

* * * *

The President's Committee is all that could be wished for. While Senator Bingham is the only one of the Committee that is an experienced airman, Howard Coffin has been an advocate of a separate Air Force Service since he was a member of the American Aviation Mission in 1920. General Harbord and Admiral Fletcher may be relied on to uphold the Army and Navy point of view. The views of the other members may be considered as open minded. The opportunity long desired by airmen is now here. No better way to gain the independence desired can be suggested than to urge everyone to advocate a single Department of Defense.—L.D.G.

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